FEBRUARY 1959

CHEMICAL PROCESSING

Shawinigan Resins thrives under 50-50 ownership . . . page 26

Marketing director W. H. Bromley (left) and vice president and general manager W. Roy Elliot shape strategy to double sales again in five years

conventions and exhibits

February 3-5. The Society of the Plastics Industry, Inc., 14th Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago.

February 15-19. American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., Annual Meeting, San Francisco.

February 18-19. Chemical Market Research Association, meeting on textile chemicals, Dinkler Plaza Hotel, Atlanta, Georgia.

March 2. Louisville Federation of Paint & Varnish Production Clubs, Annual Symposium, Sheraton Hotel, Louisville, Ky.

March 2-6. Tenth Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh.

March 3-5. Commercial Chemical Development Association, meeting, Statler Hotel, New York.

March 13. American Institute of Chemical Engineers and the American Chemical Society, Sixth Annual Joint Technical Meeting, Lamar State College of Technology, Beaumont, Texas.

March 16-20. American Institute of Chemical Engineers, National Meeting, Chalfonte Haddon Hall, Atlantic City.

March 16-20. Eleventh Western Metal Exposition and Congress, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles.

March 16-20. National Association of Corrosion Engineers, National Meeting, Sherman Hotel, Chicago.

March 17-18. Manufacturing Chemists' Association, Air and Water Pollution Abatement Conference, Netherlands Hilton Hotel, Cincinnati.

March 31-*April* 2. 21st Annual American Power Conference, sponsored by Illinois Institute of Technology, Hotel Sherman, Chicago.

. . . Meetings and shows of interest to the chemical industries

April 5-10. American Chemical Society, 135th National Meeting, Boston.

April 5-10. International Atomic Exposition, Public Auditorium, Cleveland.

April 20-22. The American Oil Chemists' Society, Spring Meeting, Roosevelt Hotel, New Orleans.

May 3-7. The Electrochemical Society, Inc., meeting, Sheraton Hotel, Philadelphia.

May 10-13. American Institute of Chemical Engineers, meeting, Kansas City, Mo.

May 14-23. International Petroleum Exposition, Tulsa, Oklahoma.

May 17. American Society for Testing Materials, Seventh Meeting on Mass Spectrometry, Statler Hilton Hotel, Los Angeles.

June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

June 10-12. Instrument Society of America, Second International Symposium on Gas Chromatography, Kellogg Center for Containing Education, East Lansing, Michigan.

September 13-18. American Chemical Society, National Meeting, Atlantic City.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre Chicago.

September 27-30. American Institute of Chemical Engineers, meeting, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, meeting, Hotel Statler, Los Angeles.

October 18-22. The Electrochemical Society, Inc., meeting, Deshler-Hilton Hotel, Columbus, Ohio.

CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

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Editorial Staff—page 6
Advertising Representatives—page 189

CHEMICAL PROCESSING serves members of the Management Team in these industries:

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OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at $1.00 the copy, or $10.00 the year. Foreign subscriptions — subscriptions from countries outside the territory of the United States and its possessions are acceptable at $35.00 per year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

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Too hot to handle?

All the clams aren't at the bottom of the ocean.

For reasons which may or may not be obvious, we've encountered some leaders in various branches of industry who have "clammed up" when asked by CHEMICAL PROCESSING:

"What are your views on importing aromatics from Iron Curtain countries?"

Is this subject too hot to handle?

We wonder when we get replies such as these:

"Under the circumstances . . . we must decline your invitation to offer further opinion," or

"For certain policy reasons, the company does not wish to comment," or

". . . We feel it wise to skip this one."

Another reply, notable for its brevity, said:

"Sorry, no comment."

There has been quite a hurrah created over these Iron Curtain aromatics. Yet, we don't feel readers have been given a provocative analysis of the situation such as will be found on page 25.

While there is reluctance in some quarters to give this subject a good old-fashioned airing, we have something right in our front yard we would like to talk about.

We are pleased to tell you that we have moved to greatly expanded CP editorial offices at 111 East Delaware Pl. in Chicago. It's just further proof of how we are growing with the growing chemical processing field.

Next time you are in Chicago, won't you drop in for a visit. We sure would like to see you.

Paul Hoffman

News Editor

Check 3541 opposite last page

highlights

CHEMICAL BUSINESS

NEW PROCESSING TECHNIQUES, MATERIALS and EQUIPMENT

NEW SOLUTIONS OF PROCESSING PROBLEMS

CHEMICAL MATERIALS

PROCESS INSTRUMENTATION & LABORATORY APPARATUS

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PROCESSING EQUIPMENT

PLANT ENGINEERING, MAINTENANCE & SAFETY

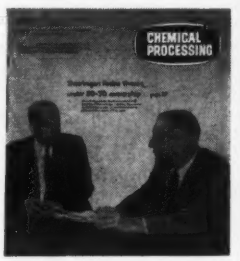
CHEMICAL PROCESSING

FEBRUARY 1959

VOLUME 22 • NUMBER 2

THE STAFF

THIS MONTH'S COVER



Having dual "parents" has proved successful for Shawinigan Resins Corp., owned 50-50 by two leading chemical companies. Rate of growth and profit picture have shown consistent upswing since firm was organized in 1937. The two men on the cover are discussing plans to double sales again in five years. Company concentrates in narrow field —vinyl resins and vinyl acetate derivatives. It manufactures and sells 54 of them. (See "Chemical Business Profile," page 26.)

REGULAR FEATURES

SPECIAL READER SERVICES

- For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page
- To subscribe to this magazine, see reader-qualification form opposite last page

letters from readers

Caught with your constants down?

Class is now in session for another lesson in uncommon constants.

If you thought Chaldron Ell Slug had some dandies, wait until you get a load of the dillies contained in this letter just received:

Dear Editor:

Chaldron Ell Slug's letter in your December issue (page 10) brings forth another use for uncommon constants. Although we have not instituted a "Variable Constant System" as he suggests, for the past 2½ years we have been sporadically engaged in developing the use of constants expressed in novel units, as the enclosed Newsletter will show.

Excerpted from Newsletter):

Constant	Unit
Speed of light	1.8×10^{12} furlongs/fortnight
Density of water at 3.98° C	3157 scruples/firkin 63141.35 scruples/kilderkin

We find two main uses for such constants: 1) They are a great aid in maintaining security on classified projects, and 2) they are a great aid in small talk at meetings and conferences, especially management meetings.

WM. H. FISCHER
Chemical Engineering

CHARLES J. GUARE
Analytical and Physical Chemistry

General Engineering Laboratory

General Electric Company
Schenectady 5, N. Y.

(Editor's Note: *And all the time we thought scruples were what people had none of!)*

Do You Have Any Constants?

Can you top these uncommon constants or those suggested by Chaldron Ell Slug? If you have any, send them to the editor. If no one else can use them, don't fret. Your efforts aren't in vain. At least one member of the staff is getting a liberal education.

Check 3542 opposite last page

LETTERS

Kudos for Lichtgarn

Dear Mr. Lichtgarn:

Your article, "Understanding of The True Nature of Creativity and Inventiveness" (December CP, page 32), is all truth and fact. I commend your attempt to open the eyes of those who control the "well oiled mechanism," but I doubt whether they can see the forest for the trees.

Your article is well written, easily understood, shows a high degree of intelligence, etc. — tops in short. I would like to see more of them.

EDGAR A. DIEMAN

Crown Point, Ind.

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We welcome your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING others will have the opportunity to hear your side.

Perhaps you agree

With what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed. If so, why not let us and others hear your ideas? Suitable letters will be published in these regular "Letters from Readers" columns. Address your comments to:

The Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

Watching Washington

Additives, Labeling, Cosmetics Due for Congressional Action

As the 86th Congress gets down to business, chemical processors should watch for possible legislation in three areas of interest: color additives, precautionary labeling, and cosmetics.

Color made news recently when the Supreme Court ruled out Red 32 used to color oranges (see September 1958 "Watching Washington"). The high court had in its hands two conflicting decisions on interpretation of the Food, Drug, and Cosmetic Act of 1938 with regard to coal-tar colors. Under the law, coal-tar colors must be from certified batches—and FDA can certify a color only if it is "harmless and suitable for use."

FDA interprets the law to mean "harmless per se," that is, the law does not allow FDA to place a limit on how much coal-tar color may be used or to say that it can be used in one food and not in another. If FDA finds a color harmless, it lists it for use without limitation. If the color is found to be harmful in some concentrations, it declines to list it at all.

This interpretation was challenged by the 5th Circuit Court in New Orleans, which ruled in favor of the Florida Citrus Exchange and others contesting the government's ban on Red 32.

This court interpreted the law to mean that the Secretary of Health, Education, and Welfare had the authority to certify colors as safe if they are harmless in the amount normally used. This, in effect, meant that Red 32 would have to be kept on the list.

Conflicting Ruling

But the ruling conflicted with the 2nd Circuit Court in New York, which upheld the "harmless per se" theory and the secretary's action in removing Orange No. 1, Orange No. 2, and Red 32 from a list of approved harmless colors for use in foods.

The Supreme Court ruled unanimously in favor of the government, stating:

"Where a coal-tar color is not harmless, it is not to be certified (as safe); if it is not certified, it is not to be used at all."

According to Justice William J. Brennan, author of the opinion, the HEW secretary's order banning Red 32 was lawful, and orange growers "present no grounds on which they can legally object to its application to them."

Despite the ruling, FDA isn't happy with the law, and has called for a "legislative re-evaluation of the national policy with respect to colors."

What FDA Likes

Here are some of the essential features FDA would like to see in a color-additive bill:

1. It should apply to any color additive, not just "coal-tar colors."
2. There should be no blanket "grandfather clause."
3. Before a color additive may be marketed for use in food (or drugs or cosmetics), its suitability for such use should be established and it should be placed on a permitted list by the government.
4. Where necessary, purity and suitability of individual batches of permitted colors should be certified by the government before marketing, as coal-tar colors are now certified. Where certification is not necessary, FDA should have the authority to exempt a

color from certification requirements.

5. The bill should forbid listing of a color for a use which will "promote deception of the consumer."

Everyone is agreed that without new legislation there is a prospect of gradual removal of colors from the permitted list. There is no indication that adequate substitutes will be developed which are suitable for acceptance on the list.

The certified color industry has redrafted proposed legislation taking into consideration FDA's suggestions. There is hope that one bill, suitable to all, will emerge.

Labeling Bills

During the last session of Congress, federal hazardous substances labeling bills were introduced, but no hearings were held. The Manufacturing Chemists' Association and the American Medical Association drafted differing bills.

An MCA spokesman reported at a recent industry-HEW meeting that several interested trade associations, as well as the AMA are working with each other with a view to coming up with one bill supportable by all. If no agree-

"It's just a short note from our man at Cape Canaveral."

ment is reached on a single piece of legislation, separate bills will be proposed.

FDA's position on labeling legislation is that a modern law is called for in light of technological developments of the past three decades. The agency is still operating under the Federal Caustic Poison Act of 1927.

As yet, though, FDA has not taken a position on proposed legislation. Commissioner Larrick has asked for recommendations from groups involved so FDA can study the issues.

Undue Burden Cited

A good, workable federal bill would result in standardization of labeling requirements throughout the country. Without a federal law, possibility exists that state or local laws would place an undue burden on manufacturers of nationally distributed products.

Right now, New York City has moved along on its own and is preparing a set of new and stricter regulations governing labeling of household as well as industrial compounds.

This "hazardous chemical labeling law" replaces present sections of the Sanitary Code requiring a manufacturer to label products with appropriate warnings. It will be up to the Department of Health to determine what products are poisonous or hazardous, and what warnings and label declarations must be made.

Cosmetics Testing Law

There's a good chance that legislation to require safety testing of cosmetics before marketing will be introduced soon. While government has not taken a position with respect to any individual bill, FDA has made the following statement with regard to possible legislation:

"It is reasonable to believe that eventually pre-testing of cosmetic ingredients and finished formulations will be required with adequate provisions for appeal from adverse government decisions."

WASHINGTON NEWS

Small business group to aid R & D programs

Good news for small chemical processors comes from the Small Business Administration, which has set up a new division to assist small firms in the formation of joint research and development programs and provide technical counsel and aid in locating and developing facilities for conducting research.

Under authorization of the Small Business Act of 1958, the new division also will try to pry more R & D work for small firms out of the Department of Defense.

Food additives session published in journal

Proceedings of the two-day FDA-Food Law Institute meeting on the new food additives amendment are available from the "Food, Drug, and Cosmetic Law Journal." The meeting, jointly sponsored by the two groups, was held recently to "acquaint all concerned with the new law and its requirements."

Approximately 550 persons attended. Some 200-plus questions were directed by industry representatives to FDA administrative officers and scientists. These questions and answers also are published in the proceedings.

AEC plans more studies of reactor concepts

Proposals for studies of three new reactor concepts have been selected as bases for contract negotiations by AEC. Proposals were submitted by American Radiator & Standard Sanitary Corporation for a study of a mercury-cooled, fast breeder reactor; General Electric Company for a study of a modified sodium graphite reactor with modules containing fuel and coolant; and Babcock & Wilcox Company for a study of a gas suspension coolant reactor.

Borden Building Two Plants; Opens PVC Addition

Units at Leominster and Illiopolis to cost total of $2 million

Borden Chemical Company has announced construction is under way on two new plants to cost a total of $2 million, almost simultaneously with dedication of a $4-million addition to another plant.

A polyvinyl alcohol plant designed to produce 5 million lb per year is being erected adjoining the company's present PVA facility at Leominster, Mass. Bearing a price tag of $1.5 million, the plant is scheduled to go on stream in October. A new continuous process, developed and engineered by Borden technicians, will be used in the plant.

Work is moving along at Illiopolis, Ill., on a coatings and adhesives manufacturing plant that is expected to be in production by July 1. The $500,000 unit will serve the packaging, building, plastics, coatings, and adhesives industries in Chicago, St. Louis, Detroit, Kansas City, and other Midwestern cities.

The $4-million addition to the polyvinyl chloride facility at Leominster has increased Borden's production capacity of this compound from 12 million lb to 38 million lb a year.

In addition to the manufacturing facilities, the company also has enlarged its development laboratories. This expansion, completed at a cost of approximately $500,000, not only doubled the size of the former laboratory but also called for a 100% increase in technical personnel.

Jefferson Chemical Company, Inc., has placed on stream at Port Neches, Texas, a new ethylene plant, first of several units to be completed as part of a major expansion program.

Completion of a direct oxidation plant to produce ethylene oxide was slated for last month. Scheduled for completion before mid-summer are a chlorine-caustic unit, an ethylene glycol plant, and units for production of propylene glycol and propylene oxide. All of these units also are at Port Neches.

Besides production facilities, other major items in the expansion program—begun in late 1956—included a new administration building, two large boilers, and deep-water dock facilities on the nearby Neches River.

The new ethylene plant will triple the company's production of this chemical. When over-all expansion is completed, plant's capacity for ethylene glycol will be doubled, and production of ethylene oxide will be increased by 50%.

Fiber Industries, Inc., jointly owned by Celanese Corporation of America and Imperial Chemical Industries Limited, of Great Britain, will build a new plant on a 215-acre site near Shelby, N. C., for production of Teron polyester fiber.

Construction on the plant's first unit was scheduled to begin by January 1. The facility will have an eventual capacity of 40 million lb per year, and will be brought into production by stages.

Teron will be produced in both filament yarn and staple fiber form for major end uses in apparel and home furnishings. When the plant is in production, it will mark the first U. S. effort to manufacture and market competitively a commercially established polyester fiber of the same chemical composition as Dacron (polyethylene terephthalate).

American Cyanamid Company is building a small scale

special production plant adjacent to its new Creslan acrylic fiber plant in Santa Rosa county, near Pensacola, Florida.

Scheduled for completion in fall, the new plant will occupy about 24,000 sq ft of floor space. It will be equipped with advanced processing machinery.

The prototype unit will permit continuing improvements in processes and products, serve as a trial area for new equipment and techniques, and speed production of custom lots of fiber. Small lots of fiber, needed by mills and other processors to prove out laboratory findings, will be produced and delivered without disruption of main plant operations.

Mobay Chemical Company's plant at New Martinsville, W. Va., has had manufacturing capacity for tolylene diisocyanate chemicals increased 50% with opening of a new addition.

Pittsburgh Coke and Chemical Company has placed on stream a new plant for production of fumaric acid. By using integrated materials from its phthalic anhydride operation, the company is said to be the second one in U. S. to produce this chemical from its own basic raw materials.

Chemetron Corporation has completed acquisition of Cardox Corporation's carbon dioxide, chlorine dioxide, and fire equipment divisions. With the acquisition, carbon dioxide activities of Chemetron's National Cylinder Gas Division will be combined to form a new division called the Cardox Division of Chemetron.

Union Carbide Chemicals Company, division of Union Carbide Corporation, has completed the first commercial unit for production of Polyox water-soluble resins. Located at the company's South Charleston, W. Va., plant, the new unit has a capacity of more than one million lb a year.

At the same time, the company announced a sharp reduction in truckload quantities of its three commercial grades of Polyox resins, designated WSR-35, WSR-205, and WSR-301.

Spotlight On People

At Shell Chemical Corporation, a company reorganization went into effect January 1 involving formation of four additional fully integrated divisions. ALFRED W. FLEER, former general manager of manufacturing, technical, heads the industrial chemicals division. (Fleer is a member of CHEMICAL PROCESSING'S Editorial Advisory Board.) MARTIN BUCK, who was assistant to the president, is chief of the plastics and resins division. SUMNER H. MCALLISTER, former manager of agricultural chemical sales division, heads the agricultural chemical division, and LAWRENCE M. ROBERTS, who was manager of operations in the ammonia division, now is in charge of that division. BERNARD M. DOWNEY, formerly general manager of manufacturing operations, and GEORGE W. HULDRUM JR., who was manager of chemical sales division, are vice presidents.

EUGENE C. SWIFT, vice president of The Sharples Oil Corporation, also takes over duties as president of The Sharples Corporation. He will serve actively in both positions.

Changes in Union Carbide Corporation management finds MORSE G. DIAL assuming the newly created office of chairman of the board. He continues as chief executive officer. HOWARD S. BUNN, executive vice president, becomes president. KENNETH H. HANNAN continues as executive vice president, BIRNY MASON JR., vice president, becomes executive vice president and, with KENNETH RUSH, vice president, has been added to the board of directors.

DR. LOUIS K. EILERS is named first vice president of the Tennessee Eastman Company and the Texas Eastman Company, divisions of Eastman Kodak Company, and president of Eastman Chemical Products, Inc. Dr. Eilers succeeds WILLIAM S. VAUGHN, who is elected vice president

and general manager of Eastman Kodak Company.

E. DUER REEVES is elected executive vice president of Esso Standard Oil Company.

Dow Chemical Company announces two changes in its board of directors as DR. E. O. BARSTOW of Midland, Mich., and R. L. CURTIS of San Francisco retire. DONALD K. BALLMAN, director of sales, and C. B. BRANCH, manager of plastics department, are elected to replace them. Dr. Barlow, who also retired as vice president, becomes honorary chairman of board, a newly created position. Curtis continues as a vice president and will remain senior officer on West Coast. LELAND A. DOAN, Western Division assistant general manager, replaces Curtis as division general manager, a position from which Curtis also retired.

ROBERT D. SCOTT is named vice president, development, of B. F. Goodrich Chemical Company. He succeeds HARRY B. WARNER, who is appointed vice president, marketing.

At Allied Chemical Corporation, FRANK M. NORTON is appointed vice president of the Plastics and Coal Chemicals Division, in charge of engineering, manufacturing, and purchasing. Succeeding him in his former post as a vice president of Semet-Solvay Division is HAROLD E. IMES, who has been director of operations for the division. RALPH H. RATLIFF succeeds Imes as operations chief.

In changes at American Cyanamid Company, R. A. HOEKELMAN is appointed director of customer relations, a newly created post; L. J. FRANCISCO is named general manager, and W. D. HOLLAND assistant general manager. EUGENE C. MEDCALF is named manager of the intermediates department, and DR. LEONARD G. TOMPKINS is made technical manager for the petrochemicals department of the Organic Chemicals Division.

HARRY E. CONNORS is new product manager of paste resins for Diamond Alkali Company.

nuclear notes

Significant news about atomic energy

Radioactive standards and sources

Group of four certified radioactive standards in solution and a variety of 16 sources all in AEC license exempt quantities, are being offered as a complete set. Supplied in flame-sealed glass ampoules, the standards and sources are ideal for making absolute calibrations of counting systems. Sets come in a walnut case along with a source handler, instructions booklet, and 100 microliter pipette with syringe.

(Model SK-1 radioactive standards and sources set are product of Nuclear-Chicago Corp., 229 West Erie St., Chicago 10, Ill.)

Check 3556 opposite last page.

Nuclear accidents and safety rules

Nuclear accidents resulting from improper storage or handling of slightly enriched uranium fuel elements will not occur if carefully developed safety rules are observed, according to N. Ketzlach, General Electric physicist at Hanford Laboratories. Speaking at a recent meeting of the American Nuclear Society, he said the encasement of 0.95 per cent enriched fuel elements in ⅛-inch iron pipe is sufficient to prevent the fuel from achieving a critical mass. For higher enrichments, the pipe should be somewhat thicker.

NUCLEAR NOTES

Gratis security clearances discontinued by AEC

No more free security clearances will be granted to holders of AEC access permits. Charges established for personnel security clearances are: $385 for "Q" clearance, $15 for "L" clearance. Revised policy went into effect January 1, 1959, but does not affect nonprofit educational institutions.

'Off the shelf' fuel elements

Standard fuel elements for nuclear reactors are being produced for "off the shelf" purchases. Four types are available, based on successful fuel elements now in use in both U.S. and abroad. Manufacturer states that these are the first of a series. Others will be available soon.

(Nuclear fuel elements are being manufactured by Sylvania-Corning Nuclear Corp., Bayside, Long Island, N. Y.)

Check 3558 opposite last page.

By-product MgF_2 slag offered by AEC

Magnesium fluoride slag containing small amounts of normal uranium is being sold by AEC. Material is by-product of Commission's normal uranium metal production. Product contains about 3% uranium and is in the form of a grayish powder.

Commission has set charge of $26 per kilogram of contained uranium on the slag, f.o.b., Weldon Springs, Mo. Since slag contains normal uranium it can be sold domestically only to persons licensed by AEC. Product is available on run-of-the-plant basis in 55-gal drum lots; each drum containing about 550 lb of slag.

(Further information about magnesium fluoride slag may be obtained by writing to S. E. Sapirie, Manager Oak Ridge Operations Office, U.S. Atomic Energy Commission, Oak Ridge, Tenn.)

THAT'S INTERESTING

Over to you man in moon

Perhaps it won't be too long before we hear from the man in the moon. And when we do, this lunar contact will be reported by a radio ear powerful enough to pick up signals for a distance of 400,000 miles — and more. The earth ear, a giant radio telescope, weighs some 200 tons and rises 110 ft from the California desert floor. Its dish-shaped antenna is 85 ft in diameter. Scientists foresaw possible extension of the tracking facility's range to four billion miles by 1962.

1957 went up in smoke

Fire losses in the U.S. reached the highest point in history in 1957. Property destruction totaled over one billion dollars in more than two million recorded fires. Topping list of building fire causes were smoking and matches.

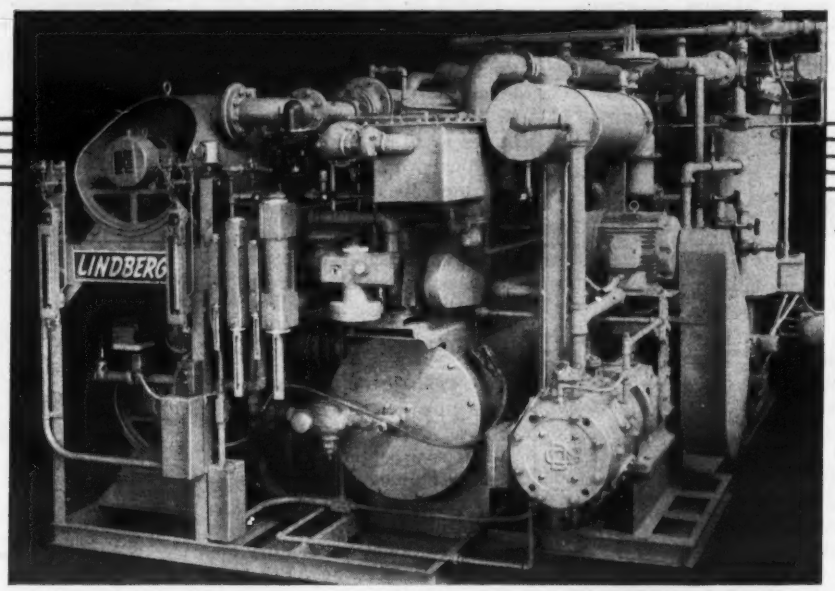
For more information on product at right, specify 3560 see information request blank opposite last page.

*Atmosphere of 99.99% inert gases now provided by new Lindberg HYNI Generator

**Completely new, fully automatic, dry process provides highest degree of nitrogen purity

***This process produces nitrogen for only $0.17 to $0.20 per 1000 cubic feet

In chemical processing, this superior nitrogen atmosphere is useful in blanketing processes under non-flammable, non-oxidizing, non-toxic, and bacteria-free conditions. It is ideal, too, for purging, bubble agitation, displacement of air, and pneumatic conveying. In the metals industry, this high purity nitrogen atmosphere is used for annealing, normalizing, brazing, hardening, and sintering. In food processing this inert atmosphere protects product quality, flavor, color, odor and appearance from contamination, oxidation, or bacterial action.



This new HYNI generator is an important addition to Lindberg's complete line of controlled atmosphere generators. It is available in capacities from 1,000 to 10,000 SCFH. Write us for complete information on this remarkable new unit, and other Lindberg generators for any required atmosphere type.

** How The Process Operates

This 99.99% pure atmosphere is produced by a completely new, dry, fully automatic process. It uses the principle of burning a hydrocarbon fuel in a separate catalytic combustion chamber to obtain complete reaction without unburned methane, high residual oxygen or a high percentage of oxides of nitrogen. Carbon dioxide, water vapor, sulphur dioxide or hydrogen sulphide are simultaneously removed in a dry, absorbent material known as Molecular Sieve made by Linde Division of Union Carbide and Chemical Corporation.

* Sample of Analysis Obtainable With HYNI Generator

Oxygen	0.00%
Carbon dioxide	0.01%
Hydrocarbons	0.00%
Water vapor: Less than -80° F. dewpoint (7 p.p.m. when measured by a Beckman Hygrometer)	
Hydrogen	0.00%
Carbon monoxide	0.00%
Sulphur	0.00%
Oxides of nitrogen	0.00%
Nitrogen and Argon (trace)	99.99%

*** This Process is Economical

One of the advantages of this process of producing nitrogen is its low cost. With the HYNI Generator the nearly-pure nitrogen is produced for only $0.17 to $0.20 per 1000 cubic feet. Cost of power, raw gas and cooling water is included and based on: fuel gas at $0.60 per 1,000,000 BTU; electricity at $0.01 per KWH; cooling water at $0.05 per 1000 gal. Quoted cost does not include maintenance or amortization. Lindberg quality design and construction assures complete dependability and lowest maintenance cost.

LINDBERG

GAS PROCESSING DIVISION
ENGINEERING COMPANY 2480 West Hubbard Street, Chicago 12, Illinois

NUCLEAR NOTES

Boron plays big role at Enrico Fermi plant

Four thousand pounds of boron will be used as an alloy in the 500-ton, steel shielding floor of the nuclear reactor at the Enrico Fermi power plant, near Monroe, Michigan. Metal will help shield the operating floor from gamma rays emitted by the fast breeder reactor.

R. C. Mahon Company, Detroit, Michigan, holds the contract to furnish all the steel shielding involved for the 72-foot diameter reactor building. The steel floor will vary in thickness from 3½ to 14 inches, and will be covered with concrete 4 feet thick.

Radioactive drug patent issued to Pfizer

Patent on production of radioactive Terramycin and two related broad-range antibiotics has been issued to Chas. Pfizer & Co., Inc., Brooklyn, N. Y. Products are important in research studies of how antibiotics work against germs and how they are distributed and changed in the body. The antibiotics are not used in therapy, hence do not have great commercial interest.

New cyclotron facility going up at Oak Ridge

Selection of a firm to provide architect engineer services for a new advanced type cyclotron facility at Oak Ridge National Laboratory has been announced by AEC. Catalytic Construction Company, Philadelphia, Pa., has begun design of the cyclotron facility. Union Carbide Corporation will design the machine and associated equipment, with Catalytic providing engineering assistance in Oak Ridge during the design.

The facility will cost about $3 million and is expected to be completed by late 1960. Machine will be known as the Oak Ridge Relativistic Isochronous Cyclotron (ORIC).

Urethane Foam Market Study Made by Allied Chemical

Use of urethane interlinings in clothes will grow from an estimated one million yd this year to approximately 15 million yd by 1960, says Dr. O. M. Morgan, director of chemical sales, Allied Chemical Corporation's National Aniline Division.

Allied also says urethane foam consumption by the furniture industries should reach 2 million lb this year and 15 million lb by 1960.

These materials — sometimes called polyurethanes — are now being used in manufacture of foams which can be made as soft as down or as hard as an abrasive. Other uses are in adhesives, which bond just about any material to any other kind of material. Even coatings have been developed which protect concrete floors normally eaten away by strong acids.

And Allied's opinion is that these promising new chemicals spell a bright future for both the company and its customers. Allied has a basic position in the market. The National Aniline Division turns out five diisocyanates and the Barrett Division produces polyesters.

Allied's Competition

Two other majors in the field are Mobay Chemical Company and Du Pont. All three are producers of diisocyanates. But as yet there has been no "hard-sell" competition in the field. The burgeoning increases expected probably will only pay for some of the development costs. Consequently, interest of all producers is mainly to stimulate and encourage the industry, hoping that within a reasonable time the foam business will be profitable.

"Major break-throughs" are thus being hailed. Every additional use which promises volume consumption and commercial status is being eagerly watched and evaluated.

What's Coming?

Allied's estimate is that urethane foams are now in a position to compete for the 300 million-lb foam rubber usage chalked up in 1957.

How does Allied expect consumption to grow? National Aniline market researchers expect the auto industry to consume 7 million lb of diisocyanate foams in 1958 . . . and grow at a rate to reach an estimated 70 million lb in 1960. The bedding and clothing industries account for 3 million lb today, and are expected to reach 30 million lb by 1960.

If the production molding industry is able to develop a satisfactory closed molding technique, Allied expects total urethane flexible foam consumption to jump from 12 million lb as of 1957 to 70 million lb in 1960.

Rigid urethane foam also represents a major volume market. But rapid progress is not expected until more research has been completed. A 5-million-lb consumption figure was forecast for 1958. Consumption of rigid urethane in 1960 will approach the 40-million-lb level.

Other applications are expected to be in the area of urethane elastomers. (This is the source of the so-called "hundred thousand mile tire".) Present consumption is only about one million lb. Only a small amount of growth is expected before 1960, and this should run to about a 3-million-lb total.

As to coatings, Allied forecast consumption should reach upward of 300,000 gal in 1958, increasing to 3 million gal in 1960.

But Allied says market studies indicate the largest volume use of urethane plastics probably lies in construction of houses. Since walls can be made by pouring foam be-

Check 3565 opposite last page

tween sheets of wood, plastic and metal, homes soon may be built of huge urethane "sandwiches" which provide insulation, sound damping, and structural reinforcement all in one.

Such a new kind of one-story panelized house would not only cut assembly costs drastically but also offer the home buyer a whole new concept in housing. Panelized houses later might be disassembled and moved to a different location.

Whether any of these become reality, Allied is certain that urethane-based products will mean attractive opportunities for profits and growth.

Quaker Oats launches $10,000 contest to find levulinic acid market

The Quaker Oats Company is looking for ideas, and will pay a total of $10,000 for those which best delineate the most significant and apt commercial use for a new product—levulinic acid, $CH_3COCH_2CH_2COOH$.

Top prize is $5000. Second prize is $2500; third, $1000; fourth, $500. There also are 100 fifth prizes of $10 each.

Levulinic acid, a new chemical, is the result of an expenditure of $500,000 and six years' research. Its principal potential use thus far seems to be that of an intermediate, Quaker chemists say.

Contest entries must be the work of an individual and not of a group. An entrant's "big idea" must be limited to 500 words or less. Prizes will be awarded on the basis of originality, economics, practicability, uniqueness, clarity, and aptness of thought and expression. Entries must be typewritten, double-spaced, on one side of white paper.

All entries must be postmarked on or before March 1, and be received before March 7. Entry must be the original work of entrant.

Entries are to be addressed to "Big Idea Contest," P. O. Box 999, Evanston, Ill.

THAT'S INTERESTING

Fuel cell developed

A fuel cell that turns chemical energy directly into electrical energy with little or no waste has been developed by Lockheed Aircraft Corp. According to *Business Week*, the fuel cell has produced electricity with an energy conversion factor of almost 70% and fuel utilization of almost 100%.

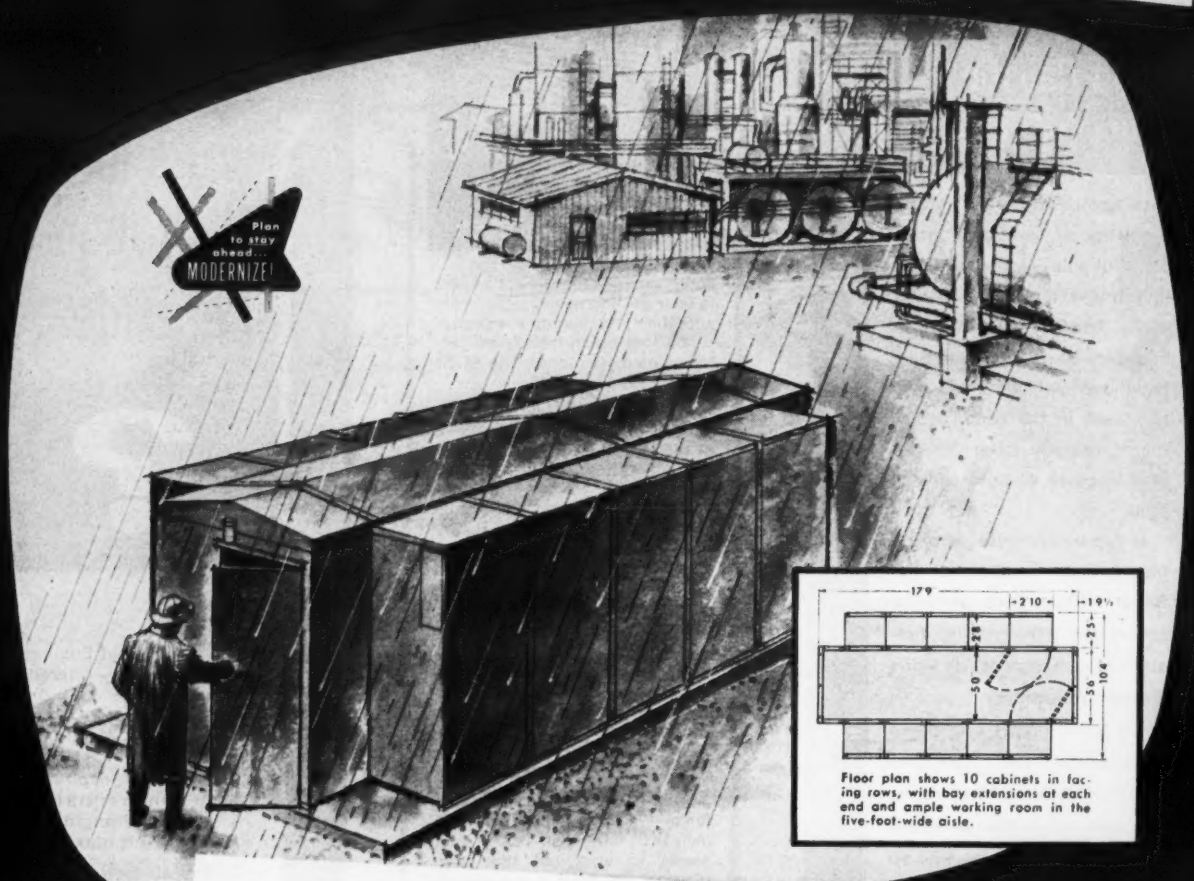
Pipe welds softened

System described as similar to "building a furnace around the weld" softens tight and hard new pipe welds. Molded material primarily composed of aluminum powder, metal oxides, refractory materials and binders is placed around weld, covered with insulation, and ignited. (*The Esso Research and Engineering News*, Esso Research and Engineering Company)

For more information on product at right, specify 3568 see information request blank opposite last page.

full SCOPE of
MOTOR CONTROL from...

ALLIS-CHALMERS



Floor plan shows 10 cabinets in facing rows, with bay extensions at each end and ample working room in the five-foot-wide aisle.

Let it rain, snow or blow...

• New, *Shelter-Clad* walk-in enclosures provide complete protection for personnel and motor control

With the new Allis-Chalmers all-steel, walk-in enclosure, you can eliminate expensive, permanent buildings. Your field personnel can carry on inspection and maintenance work in complete safety and convenience, regardless of the weather. *Shelter-Clad* units can even be arranged to provide space for your field office work.

Simple, Flexible Packaged Units

Two facing rows of Allis-Chalmers Type H, 2000 to 5000-volt motor controllers are bridged by a sturdy metal roof with the backs of the control cabinets forming the outside walls. A five-foot-wide aisle, extending the length of the unit, is enclosed with doors at each end. A basic unit can consist of any number of facing cabinets — and any number of pairs of cabinets can easily be added or removed. These units meet NEMA 3 and 4 standards for weather resistance.

For details, contact the A-C office near you, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Shelter-Clad is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

A 5881

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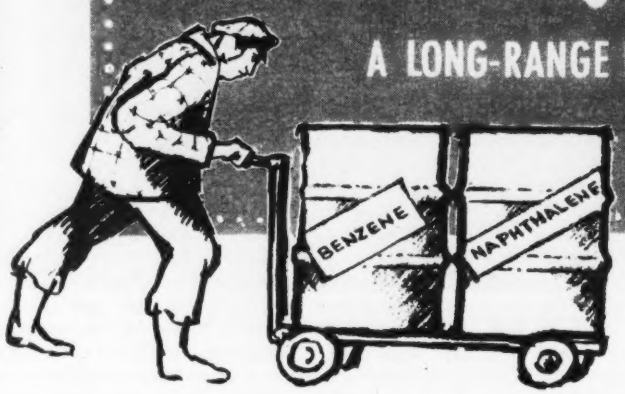
IRON CURTAIN AROMATICS

A LONG-RANGE PROBLEM



O. V. TRACY, Vice President, Esso Standard Oil Company

CUT-RATE competition from behind the Iron Curtain poses a serious current and long-range problem for U.S. marketers of benzene and naphthalene, two of our most important chemical products.

Russia and its satellites do not appear to be motivated by political reasons; rather they, like so many many other countries abroad, have a "pressing desire" for American dollars. There is no reason, therefore, to believe that the increasing flow of these vital aromatics from Russian satellites will diminish at least for several years.

Pouring of these products onto the world market is only one instance in which Iron Curtain countries in recent months have been charged with commodity-dumping practices. These also involve tin, textiles, aluminum, and platinum.

This action has had a profound effect on the price structure of benzene and naphthalene, which we in the chemical processing industry are most concerned with. Foreign naphthalene is consistently offered in this country under U.S. quotations, and imported cargoes contributed to a 5-cent a gallon drop in the benzene market last July. Most imports of these products came from behind the Iron Curtain.

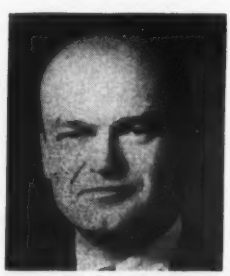
More Benzene Imported

Further proof that more trouble lies ahead is the report that in early October an additional five million gal of these aromatics were received at Houston at prices said to be at least 5 cents under U.S. quotations.

The lower realizations today for benzene probably will continue at the present level in the foreseeable future. A higher stable price does not seem likely until the gap narrows between supply and demand.

Russian benzene quality is much below that of domestic benzene, hence much of the Russian material must be processed prior to use.

Figures on benzene and naphthalene imports show that in 1955 a total of 29 million gal of benzene were received from abroad, but that from now through 1965 the total will be nearly 50 million gal or more a year. Whereas in 1955 these imports accounted for 9 percent of domestic consumption, they will range from 11 to 12 percent from now through 1965.



Nearly 30 years' intimate association with the petrochemical and synthetic rubber fields gives O. V. Tracy eminent qualifications to speak on the inroads Russian-imported aromatic hydrocarbons are making on U.S. markets. Formerly president of Enjay Company, Inc., pioneer petrochemical producer, Mr. Tracy is vice president and a director of Esso Standard Oil Company. He is one of the leaders in development of synthetic rubber, and other chemical products derived from petroleum.

Sees Demand Increase

It is expected that European demand for benzene and naphthalene will increase, but it is unlikely that this will lessen the volume flowing into world markets. More of these aromatics will be produced soon, both in Soviet satellite countries and in West Germany, because of enlarged coking operations and improved methods of recovering naphthalene.

In early 1959, U.S. potential capacity to produce benzene will be at the rate of nearly 450 million gal annually. (Humble's benzene unit came onstream in 1958; Gulf's plant is expected to be onstream the first half of 1959.) Of this 450

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What happens to a joint venture that is very successful? Does the 50-50 ownership handicap it in becoming a full-fledged corporate entity? Shawinigan Resins Corporation hasn't had any difficulties

SHAWINIGAN RESINS an experiment in 50-50 management

LAST October, W. Roy Elliot, vice president and general manager of Shawinigan Resins Corporation, located in Springfield, Mass., jokingly promised W. H. (Bill) Bromley, his director of marketing, a Rolls Royce if he could double sales again in five years. Bromley said "You'd better put in an order right now."

Whether Bill Bromley does it or not with the company's present line of polyvinyl resins will depend as much on industry growth as increasing national acceptance of Shawinigan Resins. But Roy Elliot and Bill Bromley, along with other members of Shawinigan's management team, are not relying on industry growth solely to pull the company along, or even on growing customer knowledge of company products. Aggressive programs of research and sales development, plus an extremely sophisticated theory of management, may do the job.

Shawinigan's Different

Of the thousands of corporations in the United States, Shawinigan is almost unique in that it has two owners, each with a 50% share of the business — Monsanto Chemical Company and Shawinigan Chemicals Limited. Consequently, no one has voting control. And according to some theorists of management who ask frequently, "How can it work?", 50-50 management should have exposed Shawinigan Resins to more than its share of management turmoil and difficulties.

But the company has prospered without the benefits of a single management, and, indeed, appears to have missed many of the usual causes of managerial strife during its short life. The main reason for this happy state of affairs could be the consistent rate-of-growth and profit picture. And of course healthy dividends have been paid to the two owners. No one shoots Santa Claus.

Dual Parents

Most organizations are often said to be the shadow of one man. Shawinigan Resins, as is consistent with its dual parental history, was created by two men. However, both were associated with only one company.

One was George O. Morrison, inventor of the polyvinyl acetate resins; the other was W. Roy Elliot, both of Shawinigan Chemicals Ltd. Elliot was sent down from Canada to run the plant in 1937.

Shawinigan Resins was founded in 1937 on one product — polyvinyl butyral. At that time the Canadian parent and the Fiberloid Corporation of Springfield, Mass., jointly organized the company to manufacture a replacement for cellulose acetate as an inner layer for automotive safety glass. (Monsanto acquired Fiberloid in 1939.)

During the early years, Shawinigan Resins was interested in production only. There was no need to worry about sales as every pound of product that could be manufactured was saleable.

The production schedule called for butyrals to be produced in 1938 and polyvinyl formals in 1941. But once production of formals had started, manufacturers approached the company to buy polyvinyl acetates and alcohols. Since these were intermediates in making formals, Shawinigan was delighted. Marketing — at a profit — in this manner did not use salesmen or any sales effort on the part of Shawinigan Resins. Parent companies acted as sales agents.

Peacetime Boom

In common with many other industries and companies, Shawinigan hit a doldrum area after World War II's intense activity. As soon as the slack of postwar conversion was overcome, Shawinigan sales again were limited only by production capacity.

Then, in 1949, Bromley organized the development department which is the grandfather of all company marketing efforts today. This department anticipated the market research group of today and included personnel for application research and sales service. (Many people now in Shawinigan's marketing group have come from the development center.)

As the company has matured, more and more authority has been delegated to corporation management. When the company started in 1937 it was governed by a six-man executive committee made up of directors.

The committee had full authority to act for the company, and met with Elliot each month to discuss and consider every aspect of the firm's operation. This group functioned until March 1955, when it was dissolved. In its place was created a six-man operating committee made up of directors, who immediately decided to enlarge its membership to include management located at the Springfield facility.

Two years to the month after it was organized, the operating committee was dissolved. It was replaced by a four-man management advisory committee, also made up of directors. This group meets at the call of the general manager to advise him on any aspect of company operations.

Today's Outlook

Elliot's objective has been to integrate management and operations to the point where the company can stand on its own feet. Creation of the development department in 1949 spearheaded this. Culmination was the organization of the marketing department in 1955.

But even this has not disturbed the "lean look" of Shawinigan's management. Elliot is convinced that the

Springfield, Mass., plant of Shawinigan Resins Corporation

company operates best with only the bare essentials. This has aided in development of an *esprit de corps* which Elliot likes about his organization. He thinks the reasons for it, besides the technical challenge offered by the company, is the fact that a growth company creates opportunity. By keeping the organization small, every employee's abilities are exercised to his full limit.

Basic philosophy of the mareting department has been to sell the people in chemical processing industries who will further process the material, using an engineering and technical service approach. Only vinyl acetate resins and vinyl acetate derivatives — 54 of them — are manufactured and sold.

Why limit the company operations to vinyl acetates? Management considers the company has the background knowledge, and the investment already has been made. With opportunities in the vinyl acetate field as broad as they are today, the company has found it cannot put effort anywhere else.

Today, management considers the company must emphasize technical selling, based on engineering and technical service. Industry knowledge is growing. However, the company hasn't forgotten the fact that it was built on research and the ability to supply a heavy demand for a unique product with needed end-use know-how.

Not that Shawinigan does not have competition. The company actually competes with all other resins and polymers that can be used for the same purposes. These include Nylon, the isocyanates, styrene-butadiene, and so on, together with all the products of 47 other polyvinyl acetate producers.

Management's sales philosophy is that the company must make a strong contribution to a customer's problems or the company cannot continue to sell successfully. One pet peeve of a customer, so far as Shawinigan salesmen are concerned, is the "I will get you the answer" routine. Shawinigan believes a salesman's personal prestige and that of the company demand better than just routine answers about product and applications.

What About the Future?

With the capability of self-analysis that the company management appears to have (Bromley says constantly, "How should the company act if it were not in a growth industry?"), Roy Elliot may have to come through on his joking gesture of a Rolls Royce for Bill Bromley. Small as the company is, Shawinigan's management states shortly, "We can't spend too much money on research." By force of circumstances, the company was caused to "run scared" production-wise for the past 22 years. This energy and youthful vigor now is being directed into two areas, research and sales, which must be developed if the company's growth is to be maintained.

The company now has ample capacity for the first time because of a new plant in Trenton, Mich.

Since 1951 the growth of competition has been steady. There are now 47 manufacturers in the United States of the four major types of polymer resins. Du Pont and others were making emulsions as early as 1944. In 1958, industry production of vinyl acetate was about 205 million lb. In 1953, production passed the 100-million-lb mark. Thus Shawinigan Resins is facing its future with a constantly increasing competitive market of which it will undoubtedly find its share growing, remaining constant, or shrinking.

To insure corporate growth, Shawinigan is applying hard and realistically the lessons learned and traditions developed in the past 22 years. One is to find and keep the people that it needs in research, production, and sales by constantly fostering personal development and creativity. A second is to keep a lean management, to quickly exploit results of company research. A third is to use the plus's of 50-50 ownership and control, drawing on the knowledge and experience of both parents.

Proper Education of Engineers Rests on Industry Support

DR. ROBERT LOBSTEIN
Chem-Tech Laboratories
Beverly Hills, Calif.

From the shores of the Blue Danube to the hills of Southern California is half a world away. But the move opened up a new world to Dr. Robert Lobstein, now associated with Chem-Tech Laboratories in Beverly Hills. For many years he was chief engineer and technical manager for Solvaywerke in Central Europe following his graduation from the Technical University of Vienna. Despite his heavy work schedule, he found time to continue his studies, and he received the degree of Doctor of Technical Science in 1930 from the Technical University of Prague. From 1941 to 1954 he was associated with chemical plants and engineering companies in the U.S. as project engineer, executive, and consultant. His professional activities include memberships in the Ingenieur & Architekten Verein (Engineers and Architects Association), Vienna; Verein Deutscher Ingenieure (Association of German Engineers), Bruenn, and the American Institute of Chemical Engineers.

MASS PRODUCTION of engineers in other countries points an indicting finger at the shortage of scientists — particularly competent engineers—in these United States, and has tossed into industry's lap the necessity of continuing education of engineers beyond college days.

Industry is accepting this challenge, and wants to take education of engineers partly into its own hands by training them for special industries or by upgrading technicians for engineering-type jobs. Regardless of the course pursued, it is an irrevocable fact that industry needs men who are so educated that they fit all jobs in the engineering field.

The engineer should be a man whose vision is not limited by "blinders," such as were used on horses at the turn of the century. The man who would contribute significantly to a particular field of science must be familiar with fields other than the one he wishes to make his own. The student of science should, in his earlier years, read, think, and study widely in various disciplines so that when he arrives at college he will have a real foundation for creativity in his chosen field.

Broad Education Keystone

No force can create creativity. Broad education, reading, thinking, talking intelligently can help but not create. In general, creativity in the true sense is not dependent upon education, but a broad education gives the real foundation for creativity in the engineering field.

Industry must help institutions of higher learning in every way possible to bring forth more and better engineers. The role of a university, for example, is to develop engineering science, and its responsibility is to teach it. Industry's role is to develop the art, and industry should accept this responsibility.

But institutions of higher learning cannot fulfill their task if faculty members are not properly educated. We need teachers who have an awareness of scientific problems; who grasp every opportunity to encourage an inquisitive pupil toward further study and investigation; who know how to direct laboratory work and student projects; who have a desire to make science classes a stimulating part of every high school which offers a college preparatory curriculum. When we consider how inevitable science affects our national economy and national defense, mediocrity in science teaching is not only insupportable but perilous.

One of industry's prime tasks, then, is to make it possible for teachers to obtain help from all sides, particularly by increasing their knowledge of industry's newest developments. This is a much better way for industry to obtain competent technical personnel than to hire engineering students and train them in its own way to become specialists.

Support Needed

Universities cannot fulfill their duties if they do not receive industry's full support. This is especially true with regard to research. Industry must carry out considerable research to solve manufacturing problems. If the research area constitutes special activities which are more or less in the development field, then there is no question that industry must conduct this research in its own laboratories or engineering departments.

But as much as possible and as quickly as possible the results should be given to technical institutes so that faculty members will be able to teach the progress in technical science.

But if research surpasses the usual limits of general research; if it needs more than local attention, and if the research is of a pure or basic nature, then it should be turned over to an institution of higher learning.

In this way two purposes are achieved: First, universities are assisted in educating students in such a way that they become acquainted with the latest accomplishments of technical progress; second, there is security that research is in the best hands possible and results doubtless are the best that can be achieved.

It is possible that so-called business researches push aside pure or basic research because, to put it frankly, applied research brings money — a commodity institutions of higher learning need so badly.

It is therefore of vital importance that a way be found

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AIR FIN COOLERS cut operating costs 74%

First large inland installation in North indicates trend toward air-cooled heat exchangers in areas where water is plentiful

GORDON WEYERMULLER,
Petrochemical Editor
with **JOHN W. THOMAS,**
Heat Exchange Engineer
The Standard Oil Company (Ohio)
Toledo, Ohio

New 60,000-bbl/day refinery of The Standard Oil Company (Ohio) at Toledo, which recently went on stream, uses 29 air-cooler bundles for 11 different services. This marks the first large inland installation of air coolers in the North. After a thorough consideration of all factors, it was shown that air coolers are the more economical for the services in which they are used.

In the past it has been considered that water-cooled exchangers were more economical where water was available. Hence, practically all large installations of air exchangers in the United States have been in the Southwest or similar areas where water is scarce.

Fallacy in the previous thinking on air cooling versus water cooling in the North is that all factors were not considered. If only the initial cost of heat exchangers is considered, water coolers usually appear to be the better choice. However, with water cooling, additional cooling tower capacity would have been required at Sohio.

In place of added cooling tower capacity, more water could have been brought in from Lake Erie. However, for this a 7200′ line would have been required, which would have been even more expensive than added cooling tower capacity. More piping and pumps would also have been needed. Disposal of waste water is also a problem in some cases.

Big factor, however is that operating costs of the air coolers are considerably less than half. Although initial cost of air coolers was higher, this added investment will be paid off in 1½ years through reduced operating costs. Total estimated cost of water-cooled facilities for the 11 services was $410,000. Cost for the air-cooling installation amounted to $500,000. However, operating costs for the air-cooled units are $65,500 less per year for the water coolers, a 74% saving.

Of course, each service must be judged by itself. Generally, high temperatures are most suitable for air cooling. Although the Toledo refinery uses air coolers for 11 services, water-cooled exchangers are used for other applications. One advantage of air coolers is that corrosion from water and fouling are eliminated.

Typical Services

Accompanying photographs show some of typical services where air coolers are used at Sohio. In one service, an air-cooler is used for cooling 28,000 lb/hr of vacuum tower bottoms from 680 to 450°F. The stream is very viscous, having a viscosity of 14.2 Centistokes at 450°F. Exchanger is designed for air at 95°F.

Another group of two air-cooler bundles cools 144,000 lb/hr of heavy reformate from 320 to 140°F. Two other bundles handle overhead from a reformate splitter, serving as condensers. They lower temperature of 78,000 lb/hr from 245 to 157°F. A one-bundle unit cools 75,000 lb/hr of lean oil from 317 to 140°F.

Nearly all of air exchangers at Sohio are installed in air above other operating equipment, minimizing ground area requirements.

Construction of Exchangers

Air exchangers consist essentially of a large fan placed above a bundle of Hy-Fin tubes through which the product flows — both being enclosed as shown in photos. At Sohio the tubes are bimetal — a 1″ or 1½″ OD steel tube in-

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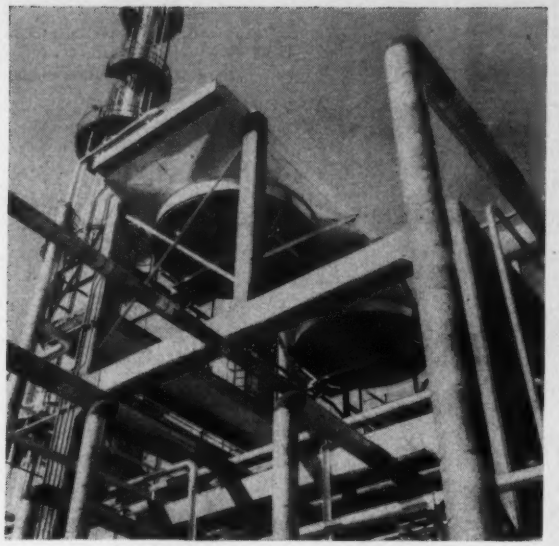
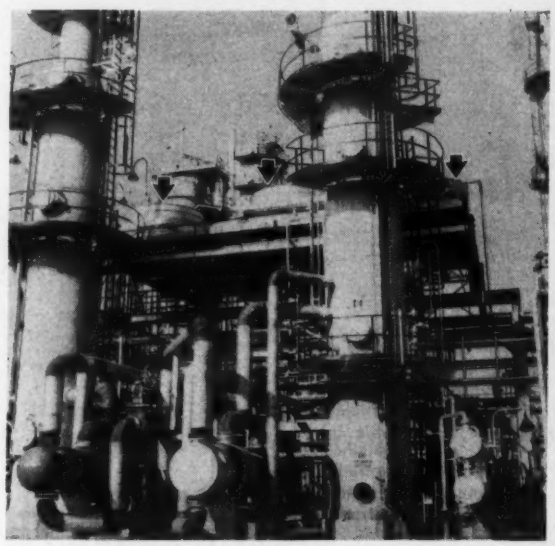


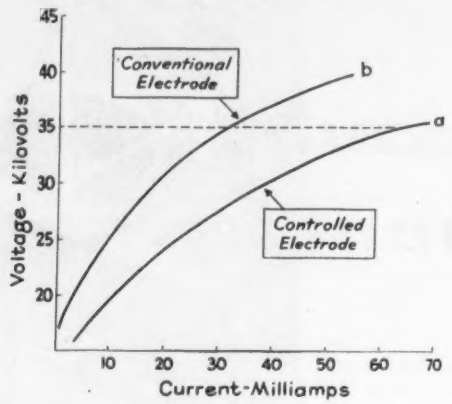
Air coolers are located above other equipment where they do not require ground room

Photos by CP Staff



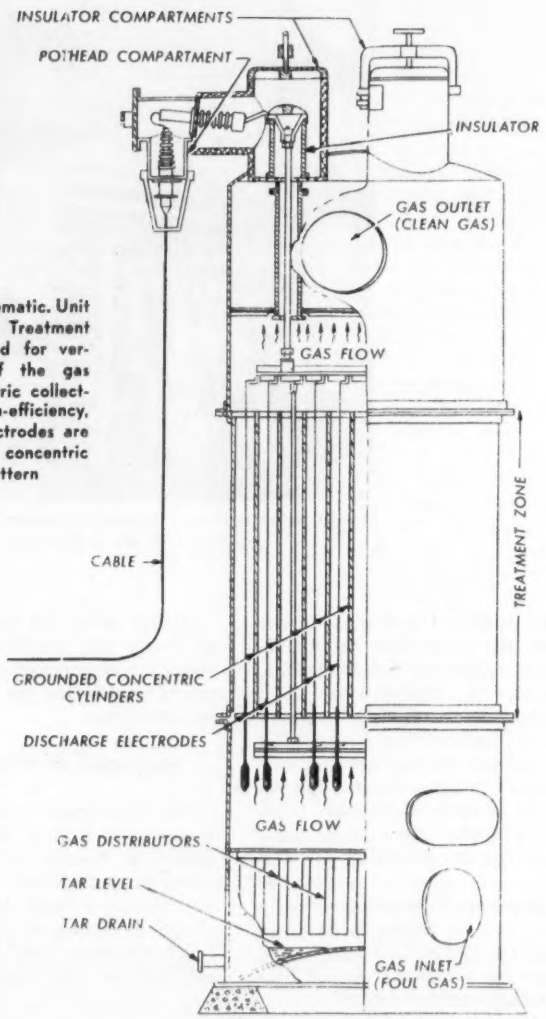
Arrows indicate three air-cooled exchangers at Sohio. Three more units are behind them

Efficiency of Koronamax electrode is shown here. At 35 kv it delivers over 60 milliamps, compared to just over 30 for conventional electrode



When it comes to discoloring naphthalene or ammonium sulfate, a little tar goes a long way. In American Steel & Wire's coal chemicals dept., impingement separators have been replaced by electrostatic precipitators that provide . . .

TOP EFFICIENCY DETARRING OF COKE OVEN GAS



Precipitator schematic. Unit is cylindrical. Treatment zone is arranged for vertical upflow of the gas through concentric collecting plates. High-efficiency, barbed-wire electrodes are arranged in a concentric circular pattern

THEODORE W. WETT, Associate Editor
with **JOHN W. HARTER,** Supt., Coal Chemicals Dept.
American Steel and Wire Div., U.S. Steel Corp., Cleveland, Ohio

PROBLEM: Tar carryover was too much the rule in coke oven gas treatment at American Steel & Wire's Cleveland, Ohio, plant. Impingement type separators did not remove sufficient quantities of tar to be effective. Naphthalene, which is very sensitive to tar discoloration, was running orange to a dark brown.

From coking ovens, gas was passed first through primary coolers where temperature was dropped from 85 to 30°C. Here, main portion of tar (about 95%) was precipitated. Gas then went through impingement separators intended to remove remaining tar before it was treated in auto absorbers by a sulfuric acid spray. Sulfuric acid formed ammonium sulfate with ammonia in gas stream. Sulfate was separated and dried.

Stream from absorbers was cooled further to precipitate naphthalene. Remaining gas was then further processed to obtain coke oven light oil.

In addition to darkening the naphthalene, tar passing through absorbers also discolored the sulfate. With growing competition for ammonium sulfate customers being evidenced by sulfate produced from petroleum sources, production of as white a product as possible was imperative.

Solution: In October 1958, two electrostatic precipitators replaced impingement separators in coke oven gas treatment system as detarrers. These are all-steel units. Shell is a vertical cylinder, with dished heads forming top and bottom of unit.

Gas enters a distribution chamber at bottom, through a 36" side inlet connection, and flows upward through the 10'-long precipitation zone. Cleaned gas flows through an outlet distributor baffle to 36" outlet connection.

Precipitation zone is divided into parallel annular gas passages or lanes bonded by concentric cylindrical collecting plates. Discharge electrodes are equally spaced (about 6" apart) around circular center

line of each annular gas passage. They are suspended from a supporting grid above precipitation zone. Guided tension weights keep discharge electrode system in proper position and alignment. System is suspended from three insulators mounted on top of each unit.

Suspended particles of tar, oil, and water fog are precipitated from gas stream. They coalesce on electrode surfaces and flow down by gravity into bottom of unit and out through a hydrostatic seal into collecting system.

Power for precipitators is supplied by a 30-kva vacuum tube rectifier unit. Automatic power regulator supplies half-wave rectified current to each unit. Power is varied automatically to maintain optimum conditions in units at all times.

Precipitators at American are among first installed on this type of service with barbed-wire electrodes. Known as Koronamax, electrodes improve efficiency of units by controlling corona discharge. By proper spacing of barbs, complete control is achieved throughout precipitator. Efficiency ratio (amount of current produced in electrodes per given quantity of input power) is greatly increased.

This advance in electrode design permits units to be designed smaller than conventional ones would need to be for given load and gas volume. Thus initial cost is reduced, in addition to obtaining more efficient, trouble-free operation.

Suspending insulators are protected from entrained materials by circulating clean gas at positive pressure over all insulator surfaces. They are kept dry by electric resistance heaters which maintain a safe differential between insulator surface temperatures and dew point of surrounding gas. This greatly extends insulator life since dirt and moisture are an insulator's worst enemies. Often, if this protection is not provided or is inadequate, an insulator will shatter completely in a very short time.

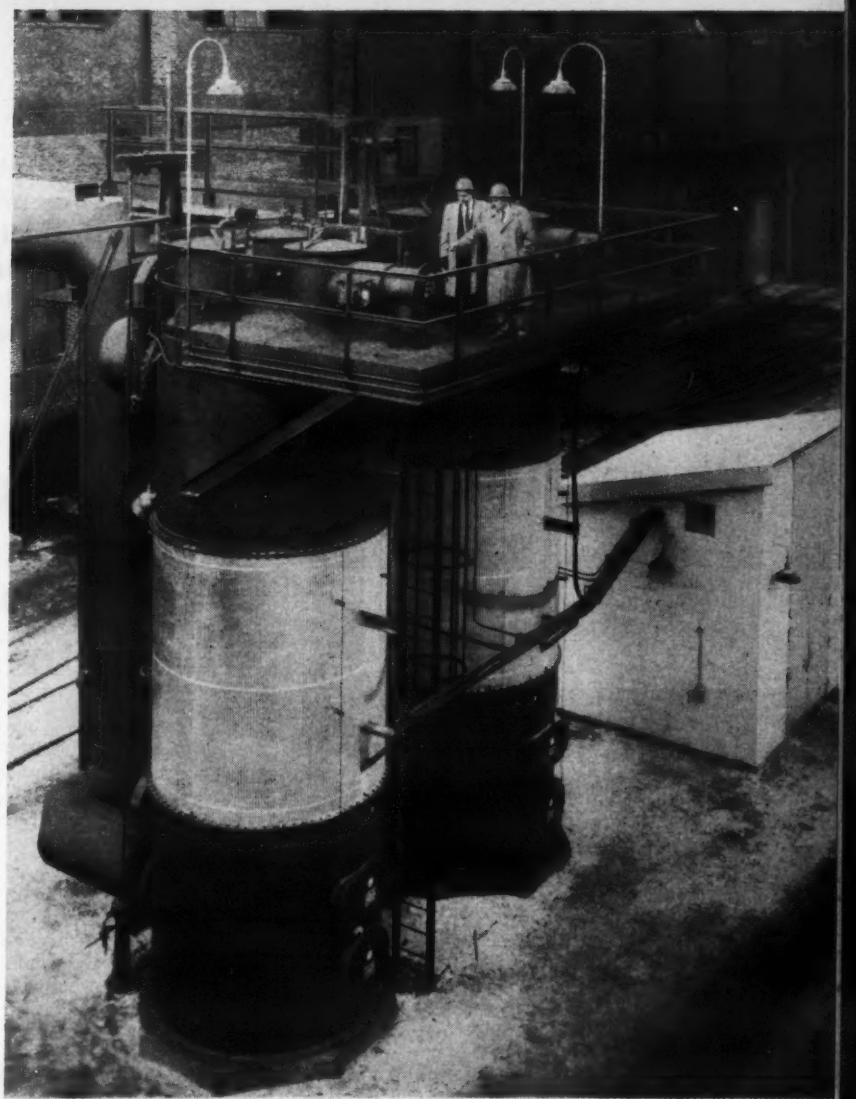
Results: Detarrers operate in parallel, each designed to treat 14,950 cfm of gas saturated at about 30°C. Based on an inlet loading of 0.35 grains per cubic foot, equipment is guaranteed to remove 96% of all particulate matter. Assuming 95% of tar has been removed by initial cooling, this represents a total removal of better than 99.9%. Since any remaining matter includes some moisture and oil, tar removal can be considered complete.

Most immediate visual result of precipitator's action has been a marked improvement in naphthalene color. Precipitated naphthalene is now white, in contrast to dark brown color formerly obtained.

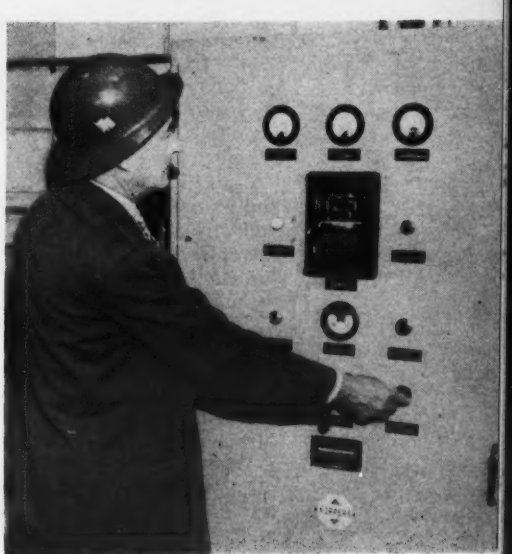
It is anticipated that there will be a corresponding improvement in ammonium sulfate produced, thereby reinforcing its competitive position. Greater recovery of both naphthalene and sulfate is expected.

(Electrostatic precipitators were manufactured and installed by Metal Products Division, Koppers Company, Incorporated, Baltimore 3, Maryland.)

Check 3570 opposite last page.



Department superintendent John Harter here indicates to W. Rastello, Works Supervisor, one of precipitator's insulator housings and power lead. Units each handle 14,950 cfm of gas at a loading of 0.35 gr/cu ft



Power pack control panel. Automatic power regulator maintains optimum operating conditions in precipitators. John Harter checks power setting

As with most chemical plants, more and more paper mills are eyeing continuous processing techniques. Designed for low operating costs and high yields, Swedish-developed Kamyr digester system is proving itself at Lincoln, Maine, mill. First of its kind in the United States, installation successfully performs . . .

CONTINUOUS PULPING OF HARDWOOD

TED F. MEINHOLD, Associate Editor
with **FRANK A. KNIGHT**
Production Manager
Eastern Corporation

CONTINUOUS pulping, with its big advantages of lower operating costs and higher yields of uniform pulp, has succeeded in gaining a strong foothold in the U.S. paper industry. Latest firm to swing over from batch process is Eastern Corporation, incorporating a continuous system in its new $11-million plant at Lincoln, Maine.

Started only a few months ago, the mill has a capacity of about 175 tons pulp per day, providing Eastern with its own source of sulfate pulp for manufacturing its lines of fine business paper.

Designed for compactness and minimum labor requirements, plant is first in North America to use a Kamyr continuous digester system for hardwood kraft pulping. The Kamyr process was originally developed in Sweden and is available in U.S. on a license basis. It has also found use in a number of other countries throughout the world.

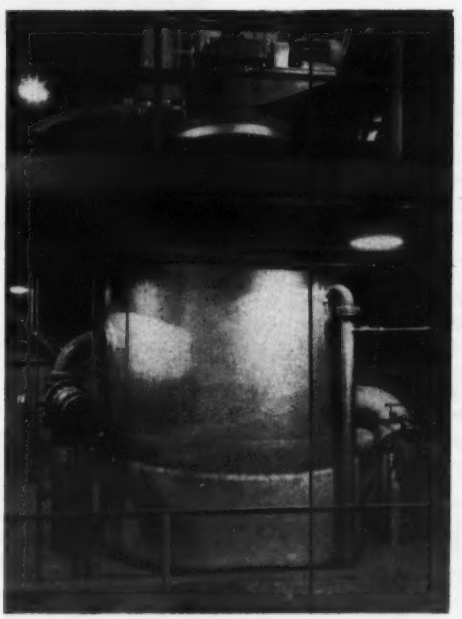
The Eastern installation is the fourth now operating in the U.S., but as mentioned above, the first designed primarily for processing hardwood. Other units currently handling softwoods are located in mills owned by Weyerhaeuser Timber, International Paper, and Gulf States Paper Company.

Digester System

The continuous digester system at Eastern has an estimated maximum capacity of 200 tons hardwood per day. Basic rating, in terms of softwood, is 150 tons.

First unit in the system is a large cylindrical chip tank having cone-shaped top and bottom. Chips from storage silos are fed to it continuously by a conveyor. Tank serves as feed tank for chip preheater, a 58″-diam by 25′-long horizontal unit.

Chips enter at one end of preheater through rotary-type feeder. Moving through unit by means of a 45″-diam helical screw conveyor, chips are exposed to 15-20 psi steam. In addition to preheating chips, steam also removes air and turpentine. Upon reaching opposite end of vessel, chips drop into chute, ready to enter top of digester.

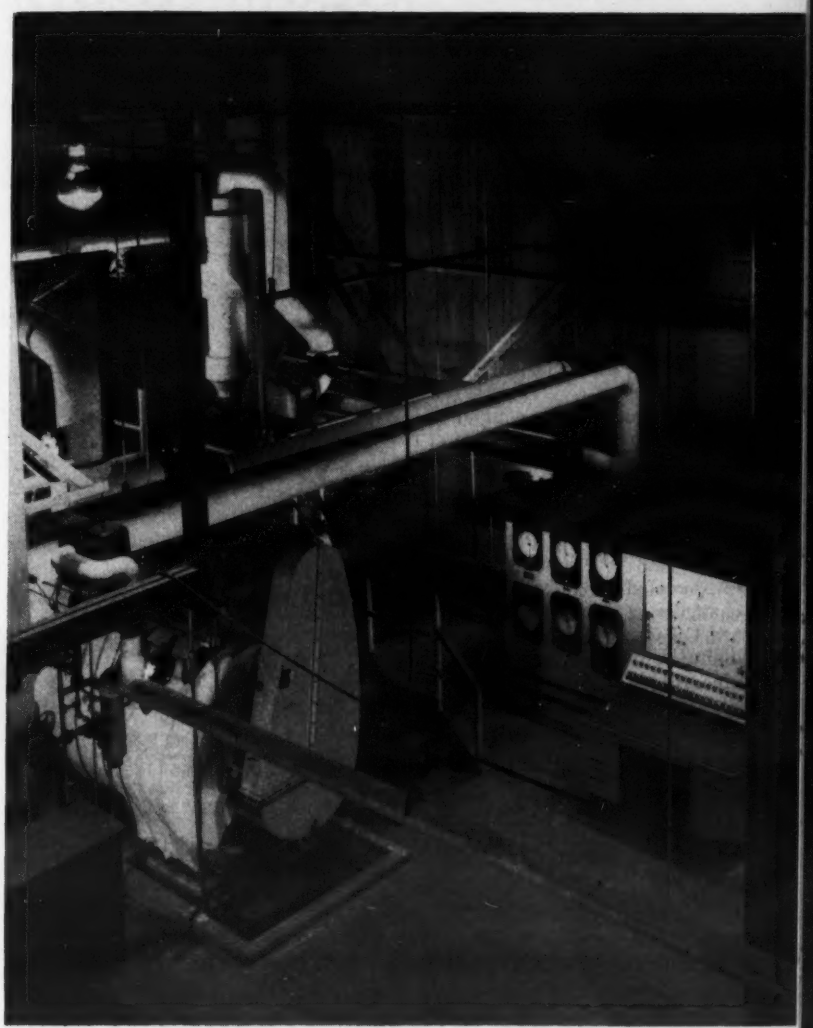


Top of 74′-high vertical digester
Photo courtesy Paper Trade Journal

Large chip tank serves as feed unit for chip preheater
Photo courtesy Paper Trade Journal

Lincoln, Maine, mill of Eastern Corporation

Kamyr continuous digester operating panel. Low-pressure chip steaming vessel can be seen at left



Actual feeding is accomplished by a high-pressure rotary feeder. Chips are mixed with recirculated pulping liquor as they pass through feeder and into digester. Operating at 165 psi, digester is a tall vertical unit measuring 74′ high. Diameter at base is 10′. Constructed of 2″-thick, mild-steel boiler plate, unit has internal strainer plates at top through which the conveying liquor passes. Rotating scraper helps keep the plates clean.

Fresh pulping liquor also enters top of digester. Flowing down through unit by gravity, the chip-liquor mixture is gradually heated from 230°F at top of digester to 340°F at bottom. Two indirect heating and circulation systems maintain uniform temperature zones about ½ and 2/3 of the way down the vessel.

Hold-up time is approximately 3½ hours. Cooked product is discharged from bottom of digester through disc-type strainer. Unit separates liquor from cooked chips so that liquor can be pumped back into bottom of digester to insure adequate dilution and trouble-free draw-off. Chips pass on to a blowdown tank. Flashed steam at 15-20 psi is returned to the steam vessel preheating incoming chips.

Blow tank holds about 12 minutes run of pulp at 12 percent solids consistency and 15 psi back pressure. Prior to discharge from tank, consistency is cut to 3½ percent by automatic dilution with black liquor. Stock is then sent through two vibratory deknotters, is further diluted to 1 percent, and is ready for additional processing into high quality sulfate pulp.

Steam Needs Cut

Since the entire pulping operation is continuous, steam demands are more uniform and less than those required in conventional batch pulping operations. Steady operation also means longer equipment life, since thermal shock, believed to be one of the main causes of corrosion in batch-type digesters, is minimized.

At Eastern, 600-psi steam is produced by two boilers, a 69,100 lb/hr black liquor recovery unit and a 70,000 lb/hr oil-fired boiler. In addition, there are a few 175-psi output pressure, oil-fired units for emergency service.

Black liquor recovery unit burns about 20,400 lb of salt-cake-free black liquor solids per hr. The recovery system features a venturi scrubber and cyclone separator for recovering chemicals (dry solids) in gases leaving furnace, and a contact evaporation unit for concentrating liquor solids.

Initial cost of a continuous digester is about the same as for a batch-type unit in small plants. In larger plants, those handling over 375 tons pulp per day, costs are appreciably less. Installing a 175-ton/day unit costs approximately $700,000. A 300-ton/day plant runs close to $1 million.

(Pulp mill was designed and constructed by The Rust Engineering Company, 930 Fort Duquesne Boulevard, Pittsburgh 22, Pennsylvania.)

Check 3571 opposite last page.

(Further information about Kamyr continuous pulp digestion system may be obtained from Kamyr, Inc., Hudson Falls, New York.)

Check 3572 opposite last page.

Air Fin Coolers

From page 29

side an aluminum tube. Fins 5/8" high are extruded from exterior walls of the outer aluminum tubes. Hence, fins cannot become detached because of vibration, shock, or pressure variations. The ratio of outside surface area of tube to inside is about 17:1.

Fan pitch can be varied to regulate air flow on all of exchangers. This is done manually on all of units except one. On this one unit, where it is desirable to maintain the temperature of overflow from a crude tower at 295°F, pitch of fan is adjusted automatically according to temperature of crude being cooled.

Foreign Installations

Although up to now large installations of air-cooled exchangers have not been made in the United States in areas where water is plentiful, air-cooled exchangers are used widely in European countries. Recently a large petroleum company on the East Coast announced that air fin coolers will be used in new refineries being built in Wales, Holland, and Norway. This is the first time air coolers have been used in new refineries built by company.

Engineers of this company estimate that savings of several million dollars in investment costs will be made in these refineries through the use of air coolers. Need for water, sewers will be less.

(Air-cooled finned heat exchangers in use at The Standard Oil Company (Ohio) were manufactured by Hudson Engineering Corp., 2711 Danville St., Houston, Texas.)

Check 3573 opposite last page.

(Finned tube is based on patents of Wolverine Tube, div. of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich.)

Check 3574 opposite last page.

(New Sohio refinery was designed and built by The M. W. Kellogg Co., 711 Third Ave., New York 17, N. Y.)

▲ GRINDING DOWN ONE OF THE WELDS made in the vapor condenser shell of Revere Herculoy. Completed unit measured 90" x 26' with a total weight of 100,000 lbs. Units were fabricated by ADSCO DIVISION, YUBA CONSOLIDATED INDUSTRIES, INC., Buffalo, N. Y.

◀ TUBE BUNDLE of 2,150 Revere Copper Tubes, each ¾" in diameter, rolled into 4,300 Tube Sheet holes, with a total weight of 26 tons and producing a surface of 14,000 sq. ft. To prevent damage during shipment wax was poured around the unsupported rounded ends of the tube bundle, which, when hardened, held the ends firmly in place. After the exchanger was placed into position the wax was blown out with steam.

exchangers contain REVERE METALS

105,000 lbs. of Revere Copper Tube and 50,000 lbs. of Revere Herculoy Plates are used in two 50-ton units fabricated for National Aniline Division, Allied Chemical & Dye Corp., by Adsco Division, Yuba Consolidated Industries, Inc.

These two units are duplicates of the two constructed for National Aniline Division, Allied Chemical & Dye Corp. in 1953.

In addition to their huge size and weight it is interesting to note that the tube bundle was constructed of copper tube because of its high thermal conductivity and corrosive-resisting characteristics, and the shell made of Herculoy because of the accuracy and speed with which it can be welded, its great strength and corrosion-resistant features.

Herculoy is Revere's silicon bronze with the tensile strength of mild steel and corrosion-resistant qualities of copper, and is a natural for shells such as these. Its characteristics also make it the economical answer for tube sheets and plates.

It is jobs such as this that have given Revere the background of experience that can prove valuable in the solution of your particular metals problem. And is still another example of Revere's Technical Advisory Service helping to select the right metal, in the right form, to do the best possible job with the greatest economy . . . whether it be copper, brass, aluminum, or any one of their alloys.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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COPPER • BRASS • 18 01 • REVERE • ALUMINUM

Check 3575 opposite last page

Fire-protection gate valve of stainless steel guards flammable chemicals

Flow of corrosive flammables to fire areas is prevented at American Cyanamid Company's Warner's plant at Linden, N.J. by stainless steel, fire-protection valves. Units are used in lines below storage tanks containing ethyl mercaptan, ethyl alcohol, methanol, acrylonitrile, and methyl ethyl ketone.

Essentially a modified bolted-bonnet gate valve, exterior springs snap valve shut when a fusible link reaches melting temperature of 160°F. Fabricated of 316 stainless steel, valves and springs resist both exterior and interior corrosion; can be used at pumping pressures up to 150 psi.

A special design feature is rotating double disc assembly which maintains tight seal even when valve body distorts because of heat. Company and manufacturer report absence of problems since initial installations, and the gate-type cut-off valves are now replacing counterweights and bellows valves throughout plant. Replacing fusible link, held in place by two pins, is easy during the once-a-year testing period.

Space and position no longer are limiting factors in strategic use of valves because new ones are compact and have no counterweights. Valve can be installed in any position in cramped or highly inaccessible plant locations.

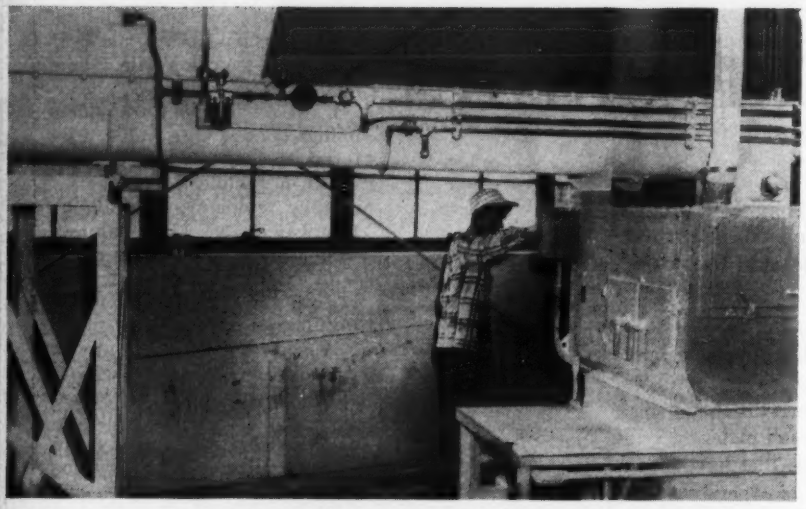
Complete fire-protection valve is said to be competitive in price with those made of carbon steel.

(Stainless steel valves are produced by Cooper Alloy Corp., 100 Bloy St., Hillside 5, New Jersey.)

Check 3576 opposite last page.

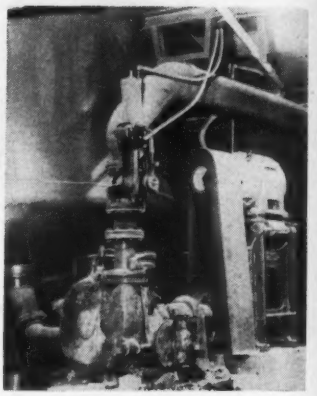
Manual unloading of dusty, spray-dried material was costly, time-consuming job. Shift to automatic equipment . . .

Slashes clay handling time 65%, eliminates material loss



Surge hopper (left) delivers clay into screw conveyor (center) for discharge into scale (right), where material is automatically weighed and discharged

After leaving scale, clay falls through another hopper into reversible screw conveyor which feeds into one of two slurry tanks (foreground)



Final slurry is pumped from bottom of mixing tanks through pipe leading off at right to storage. Device in line is air-operated plug cock with automatic shut-off valve which opens when pump starts and closes when pump stops

PROBLEM: Unloading bags of spray-dried predispersed clay was a time-consuming job, taking four men a full day to empty a freight car of six hundred 100-lb bags at the Johnsonburg, Pa., paper mill of New York and Pennsylvania Co. After bags were unloaded, they had to be opened and hand-dumped into slurry tanks for mixing with water.

Bags often were mishandled, resulting in loss of clay and creating serious dust problem. Possibility of contamination always was present. Difficulties in handling were encountered because clay is somewhat cohesive as well as flushy in nature. ("Flushy" materials are defined as materials which, by their nature, tend to flow irregularly—with sudden increases in volume—which can cause bad overflow problems.)

Compounding the difficulties was the fact that increased industry demands for coated stock resulted in need for quantities of coating preparation in excess of what manual clay handling could meet.

Solution: Completely automatic clay preparation tower, with pneumatic bulk unloading, and weighing equipment was constructed alongside one of many railroad sidings at plant site. One man operates master control panel.

The pneumatic system consists of recently developed dual-feed unloader, conveyor, and filter.

On dual feeder are two airlocks, each of which is affixed directly beneath outlets in covered hopper cars which hold 50 tons of clay divided into two sections.

Unloader is attached to enterprise gates at bottom of car, and air and conveying line hoses are hooked up to car and unloader. After car outlets are opened, blower is started. Material drops by gravity through gates into unloader, then into conveying system, which consists of two 5″ flexible hoses connecting into main 8″ conveying line.

Clay is moved through conveyor system to filter on top floor of preparation building, 50 feet distant. There clay is separated from conveying air. Latter is piped to exhauster which provides both activating air and vacuum for entire system.

Clay is discharged from filter into surge hopper through completely enclosed rotary airlock.

Screw conveyor, which delivers clay from surge hopper to scale was specially designed to meet requirements of job. Receiving end has gradually increasing pitch so material gets under way without plugging or arching. Special tube fitted midway in conveyor restricts tendency of clay to flush. Double flights in exit end deliver material quickly and in even stream to inlet chute of scale.

Scale itself has vibrators on weigh hopper which are actuated whenever discharge door is opened. This assures that all weighed material is effectively discharged from weighing hopper.

Door on weighing hopper is power-operated and brush-sealed so no material can escape during weighing operation. Clay is discharged quickly and completely — in 250-lb batches — when hopper door is opened after each weighing.

Fed to Slurry Tanks

Reversible screw conveyor receives scale discharge and feeds it to one of two mixing or slurry tanks. Scale discharge is controlled by electric counter set for required number of discharges. Scale automatically stops upon completion of specified number.

Whenever surge hopper fills, feeding system is shut down to prevent plugging the feeding supply arrangement.

Man at master panel also controls slurry preparation and mixing, which begins with metering purified water into twin slurry tanks. Preweighed clay is added until complete batch consists of 25,000 lb.

Slurry is mixed by propeller-agitator in side-baffled tank. Mixing full batch to slurry consisting of 70 percent solids takes about one-half hour, after which slurry is automatically withdrawn from tank bottom and pumped approximately 100 ft to storage.

Results: One man at master control of pneumatic system can unload 25 tons of bulk clay an hour, resulting in 65 percent slash in clay handling time. Entire operation, allow-

ing time for each phase of process from dry clay in cars to mixed slurry in storage tank, takes no more than four hours.

New system also has eliminated loss of clay, reduced dust problem, provided contamination-free operation, and improved employee relations at the plant.

Conveyor system similar to one described herein also is used by company at its Lock Haven mill to handle clay requirements.

(Pneumatic unloader, Airveyor, and Airveyor filter are designed, engineered and built by Fuller Co., Subs. of General American Transportation Corp., Catasauqua, Pa.)

Check 3579 opposite last page.

(Class 50 Scale and special screw conveyor is product of Richardson Scale Co., Clifton, N. J.)

Check 3580 opposite last page.

At International Salt rubber-lined tank lasts much longer

Salt-sulfuric acid solution handled by vessel

Problem: At the Ludlowville, New York, refinery of International Salt Company, a steel tank used in process had a life of only one to two years. Tank was used for mixing service at a point where sulfuric acid is added to sodium chloride brine. Solution in tank had a pH ranging between 2.5 to 5.

Solution: In 1952 a rubber-lined tank was installed in refinery. Composition of rubber is one developed particularly for acid service.

Results: Rubber-lined tank has been in continuous service handling the corrosive mixture for the past six years. It is still in good condition, apparently having years of useful life remaining.

(Rubber lining for tank is product of Gates Rubber Co., 999 South Broadway, Denver 17, Colo.)

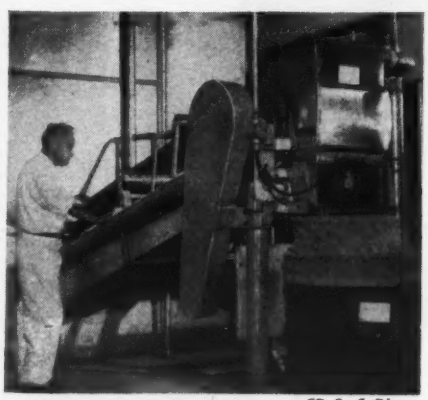
Check 3581 opposite last page.

Equipment consists of 3 vibrating tiers mounted one above the other in a 3-deck formation. Feed enters at far end of top tier, drops down successively to third tier, and leaves through chute at lower left. System is located inside stainless-steel enclosure which prevents heat loss, product contamination

Handling heat-sensitive pharmaceutical tablet formulations, continuous granulation-drying system . . .

• combines 2 operations into 1
• cuts processing time over 50%

TED F. MEINHOLD, Associate Editor
with **RAY SWANSON,** Granulating Supervisor
Abbott Laboratories



CP Staff Photos

Coming out of dryer (rear), product is transferred by belt conveyor to 55 gal drums

Problem: Grinding and drying pharmaceutical tablet formulations was a laborious and time-consuming job at Abbott Laboratories, North Chicago, Illinois. Performed in conventional batch-type processing equipment, the operations involved considerable handling and transferring steps. Extreme care had to be taken to prevent heat damage, product contamination, and minimize product loss.

Over a dozen different formulations were involved, including Sucaryl® (cyclamate) sodium, phenobarbital, thiamine, nicotinic acid, and other drugs. These were made up in a large blender, passed through a mill, dried in a tray-type dryer, and then ground to final size (10-16 mesh) ready for tableting.

Batch sizes vary from 800 to 1500 lb. It would often take as much as three days to finish a batch. Big bottleneck was drying operation. Moisture had to be reduced from 17-24% to less than ½ of 1%. Conducted at 140°F, it took anywhere from

16 to 48 hr to accomplish this in the dryer.

Solution: Company installed a continuous drying, cooling, and granulating system for the operation. Designed as a complete packaged unit, equipment is fully enclosed and occupies a space 30′ long by 15′ wide by 10′ high.

System consists essentially of three 20′-long by 5′-wide, vibrating dryer tiers located one above the other, forming a three-deck arrangement. Crushers, granulators, and sizing screens are so positioned that grinding, drying, and sizing operations can be carried out continuously, without removing material.

Design conserves space and headroom and by-passes need for intermediate material handling equipment, storage, and labor. Heat losses are also eliminated and rigid process control is easily maintained.

Materials are moved along the solid plate stainless steel tiers by gentle low-frequency vibration. Tiers are heated from below by steam-heated air. Speed of travel and depth of material can be varied as required through the various processing zones. Automatic controls assure maintenance of proper conditions.

There is no serious falling or cascading of product or any rolling of particles on one another. Material does not cake and has uniform appearance.

Results: The continuous system has cut processing time at least 50%. Batches that used to take 2 or 3 days are now easily completed in 1 day. Combining the grinding and drying operations has simplified processing, reduced labor, and essentially eliminated product loss. Uniformity of product has improved and danger of product contamination due to excessive handling has been removed.

The drying bottleneck has also been solved. Holding time in the dryer is now only 12 to 14 minutes. Average feed rate is 300-400 lb per hr.

The yearly equipment utilization averages about 75% based on an 8-hr day. Maintenance has been negligible. Unit takes 40 minutes to heat up in the morning and 15

minutes to shut down in the afternoon. Cleaning between batches requires 2 to 3 hours. Although this does not cause any problem when handling large batches, it is a handicap when small batches (less than 2 hr runs) are processed.

(Vibrating process equipment was installed by the Jeffrey Manufacturing Company, Columbus 16, Ohio.)

Check 3584 opposite last page.

Phenolic-type linings in drums halt attack of lithium bromide

Problem: Highly corrosive characteristics of lithium bromide, used in air conditioning systems, made it difficult for Foote Mineral Company to ship the chemical in conventional steel containers from its Exton, Pa., plant. Contents had

Pigmented phenolic-lined drum is filled with highly corrosive lithium bromide just before shipment

to be either kept from contacting the metal or it had to be contained in a vacuum. The latter method was economically impractical.

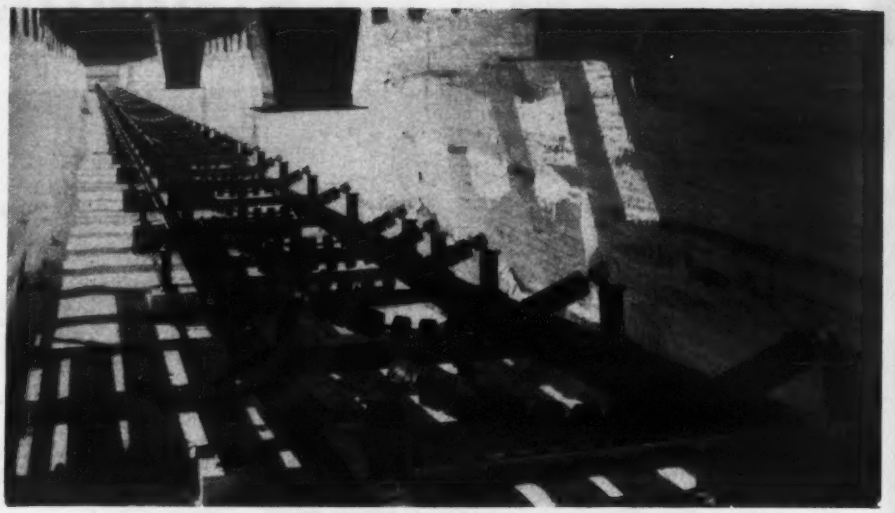
Solution: Drums with pigmented phenolic-type linings were obtained.

Drums, which are of 30-gal capacity, hold about 400 lb. Manufacturer guarantees no content loss for 3 months.

Results: Linings block chemical attack. Many drums, Foote reports, have held corrosive material longer than three months. Coverage is complete and uniform.

(Drums are manufactured by Container Div., Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.)

Check 3585 opposite last page.



Recovery conveyor during construction, showing neoprene idlers and conveyor frame. This trench-like area was cut from solid salt

Flexible Conveyor Idlers Provide Trouble-free Service

No lubrication needed for flexible neoprene units used to continuously transfer salt and potash

GORDON WEYERMULLER, Associate Editor
with **L. W. FERRIS,** President
Bonneville, Ltd., Salt Lake City, Utah

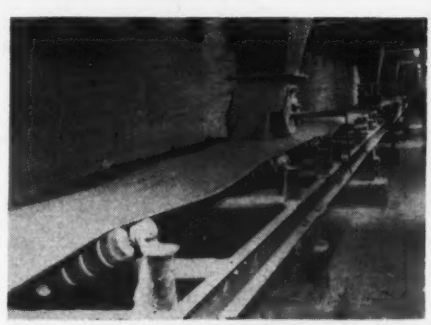
Belt conveyors which utilize flexible idlers designed to withstand continuous service under severe conditions have provided trouble-free operation during 2½ years use at Bonneville, Ltd., near Wendover, Utah.

Plant uses five conveyors with a total length of 1112′ for handling salt and potash at temperatures to 250°F. Longest of four conveyors is a 415′ unit. Of the several hundred idlers in use on these conveyors, none have failed since installed in early 1956.

Construction of Idler

Idler consists of resilient neoprene discs molded to a neoprene-covered wire cable that is freely suspended from two sealed ball bearings. These bearings are mounted on stands about one foot above the channel frames or truss sections so that contamination from dust is less likely. There are no bearings under the belt. Idlers are spaced about 4-6′ apart along frames.

Use of these non-metallic idlers eliminates the need for lubrication, which is normally performed twice a week on conventional idlers. With elimination of oil or grease, contamination of rubber belt or product is minimized. Idler keeps itself clean because it flexes with every turn. Cushioning effect of the resilient idlers



Recovery conveyor during operation. Sealed idler bearings have needed no maintenance despite being covered with salt

is also expected to lengthen belt life.

For this installation a neoprene coating was applied to all idler brackets and exposed steel parts. Idler bearing cases were not coated since they are cadmium plated. Structural framework was painted with one coat of zinc chromate orange.

Slope Conveyor

In order of material flow in plant, outside slope conveyor is first. This unit is 295′ long and uses a 24″ belt. It is designed to handle 75 tons of material per hour with belt speed of 150 fpm. Maximum lift is 57′.

From slope conveyor, load goes to top conveyor inside building. This unit is 175′ long and also uses a 24″ belt. Quantity of material handled and speed is same as preceding conveyor.

Top conveyor transmits load to 152′-long shuttle conveyor. This unit shuttles back and forth on track to deliver load to storage bins beneath. It uses same size belt and handles same load with equivalent speed as the two preceding units.

Recovery Conveyor

The 415′-long recovery conveyor uses a 30″ belt. It takes material from storage bins, conveys it outside to waiting rail cars or trucks. Conveyor dumps material into a hopper, which loads a bucket elevator. This, in turn, raises material high enough so it can be loaded into chutes which feed cars or trucks. Slight incline at head of conveyor lifts load about 11′. Capacity is 125 tons/hr at 150 fpm.

Fifth conveyor is 75′ long and uses a 24″ belt. It takes material from outside storage bin to flotation mill on incline lift of 30′. It is designed to handle 80 tons of material per hour at 150 fpm.

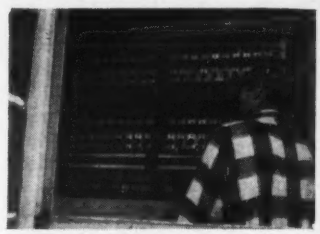
(Limberoller idlers, truss sections, and channel frames are products of Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.)

Check 3587 opposite last page.

Silicone rectifier works in parallel with rotary and mechanical units

Problem: Hercules Powder Company needed additional amperage for chlorine producing electrolytic cells at the Hopewell, Virginia, plant. While investigation seemed to indicate that a semi-conductor metallic rectifier would be best, it was not desirable to retire existing conversion equipment.

Manufacturers were contacted to determine practicality of operating two rotary converters and one mechanical



Portion of semi-conductor rectifier open for inspection. Unit operates in parallel with mechanical rectifying equipment

rectifier in parallel with semiconductor unit. It was believed that the metallic rectifiers built up to that time might not operate successfully in such a setup.

Solution: In November 1957, a 3000-kw, 10,000-amp, 300-volt, DC silicon rectifier was put in service at Hopewell. Among features of unit was a protective means which made it possible to operate semiconductor unit in parallel with all existing conversion equipment.

Unitron rectifier consists of two 5000-amp, 300-volt, DC, 6-phase, bridge-connected rectifier sections fed from two separate secondary windings of a common transformer. One winding is delta connected, the other wye connected resulting in 12-phase operation. Complete unit has 480 rectifying cells. Cells are water cooled in such a manner that liquid system is not disturbed when replacing a defective cell.

As semi-conductor rectifier operates on a common DC bus with two rotary converters

and one mechanical rectifier, a bus fault could cause loss of all cells and their fuses. To protect against such an eventuality, a magnetic core of square loop material is installed in each of two 5000-amp, positive DC leads. When a fault occurs, flux change is detected by a trip winding on the core causing operation of short circuiter on the AC side of the semi-conductor rectifier. This unit creates a bolted short circuit in 40 microseconds.

Each rectifying cell is protected by a high-speed Amp-Trap fuse, self indicating. Fuse protecting a faulted cell will blow but no other cells will be affected. Unit will continue to operate until a convenient shutdown can be arranged.

Rectifiers and converters are used to provide direct current to electrolytic cells on a 20,000-amp bus.

Results: Semi-conductor rectifier has operated at 10,000 amp when other equipment is out of service. It has operated continuously in parallel with a 5000-amp mechanical rectifier and one or two 5000-amp rotary converters as required. It has continued to operate one section when the other tripped out and has been unharmed when a backfire occurred on the mechanical rectifier.

(Unitron semi-conductor rectifier was supplied by I-T-E Circuit Breaker Company, 19th and Hamilton St., Philadelphia 30, Pa.)

Check 3590 opposite last page.

Sodium reactor experiment and organic-moderated reactor experiment forum proceedings are contained in 248-page publication. The two experimental nuclear power reactor projects are being conducted for the AEC by Atomics International Div., North American Aviation, Inc. Discussion of engineering development work for 75,000-kilowatt nuclear power plant for the Consumers Public Power District of Nebraska, and description of full scale organic moderated reactor to be built for the city of Piqua, Ohio are also included. To obtain "Proceedings of the SRE-OMRE Forum", remit $3.00 direct to Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

Condensate return system cuts steam costs 40%, pays out in 30 days

Ups dryer's TiO_2 output 30% assures top quality product

Problem: Method of boosting production and cutting steam costs on a large continuous, belt-type dryer was sought by an Eastern chemical company. Used to process titanium dioxide, dryer required about 9000 to 10,000 lb steam per hr. Product throughput averaged approximately 50 tons per 24 hr. Final material contained less than one percent moisture.

Dryer consists of six individually heated sections. Duplicate heating coils had been added to each section so that maximum production could be achieved within the physical limitations of the dryer itself. Boilers at the plant operate at 150 psi. Due to line losses between boiler room and dryer, actual steam pressure at dryer ranges between 125 and 135 psi.

Conventional open-type condensate removal system was used with the traps installed in each dryer coil section. The 12 traps discharged to a condensate header which in turn discharged to an open hotwell located about 50 ft from dryer.

Solution: Company installed a closed-loop, high-pressure condensate return system on the dryer. System returns condensate directly to boiler or make-up system with minimum heat loss and permits rapid and complete transfer of latent heat from steam to product. Thermal losses experienced with conventional open-drain systems are eliminated.

Key unit in the system is a jet pump energized by a centrifugal pump that is always primed by its own discharge pressure. Condensate from return line enters through strainer into pump's jet chamber. Here it is drawn into mixing chamber and circulating loop by the jet pump nozzle.

As condensate enters the already-filled loop it causes discharge of equal volume of water through the air separator to the boiler supply line. Entrained air and gas are vented from system in a separator, and condensate is returned to boiler at high temperature.

Results: Dryer now uses only 6000 lb steam per hr while producing 65 tons product every 24 hr. This means that steam costs have been cut 40 percent and production upped 30 percent. Savings are so great that entire cost of the high-pressure condensate return system is recovered every 30 days of continuous operation.

Because of system's ability to up latent heat transfer, maximum efficiency is obtained from each drying coil within the dryer, accounting for the big production boost. Steam savings are due to the fact that steam remains within dryer coil at a high back pressure until all latent heat is transferred to the product.

After condensate return system was placed into operation, tests showed that condensate inlet pressure was 70 psi. Condensate is returned to boiler at 316°F, 160 psi.

Because of the uniform latent heat transfer, top product quality is also assured. Other advantages are that water treatment costs and make-up water needs are cut to a minimum.

(Further information about Cochrane C-B condensate drainage control units may be obtained from Cochrane Corporation, 17th below Allegheny Avenue, Philadelphia 32, Pennsylvania.)

Check 3593 opposite last page.

NEXT MONTH

Have process changes ever caused you trouble? How pipeline mixer whipped such a problem in bleach plant of Bowaters' giant $100-million paper mill at Calhoun, Tenn., is told in next month's New Solutions section.

CUT HERE AND FILE

Transmission of Gas at High Pressure

F. P. VANCE
Idaho Falls, Idaho

Following equation is useful in design of pipe lines for transmission of gas at high pressures:

$$Q = \frac{80.8}{\rho_0 \mu\ 0.0814}\left[\frac{D^{4.85} M (P_1^2 - P_2^2)}{L Z_{AV} T}\right]^{0.541} E$$

where

- Q = quantity of gas transported in cu ft/day measured at P_0 and T_0
- μ = absolute viscosity of gas, lb/ft-sec
- ρ_0 = density of gas, lb/cu ft at P_0 and T_0
- D = inside diameter of pipe, in
- M = molecular weight of gas, lb/mole
- P_1 = discharge pressure from compressors, psia
- P_2 = suction pressure to compressors, psia
- L = distance between compressor stations, miles
- Z_{av} = average deviation (compressibility) factor
- T = flowing temperature, °R
- E = experience factor for adjustment of formula, 0.90

This equation is basis for accompanying nomograph[2], which facilitates solution of case for optimum spacing of compressor stations, pipe sizes, and other pertinent factors.

Typical Example

What should be diameter of a pipe needed to transmit 10 million cu ft of gas per day over distance of 15 miles at 100°F, if molecular weight of gas is 20, viscosity is 0.0001 lb/ft-sec and $(P^2_1 - P^2_2)/Z_{av}$ is 150,000?

Connect 100°F on T and 10^{-4} on μ scales to locate an intersection with axis I. Extend a line from this intersection through 20 on M to meet the K axis.

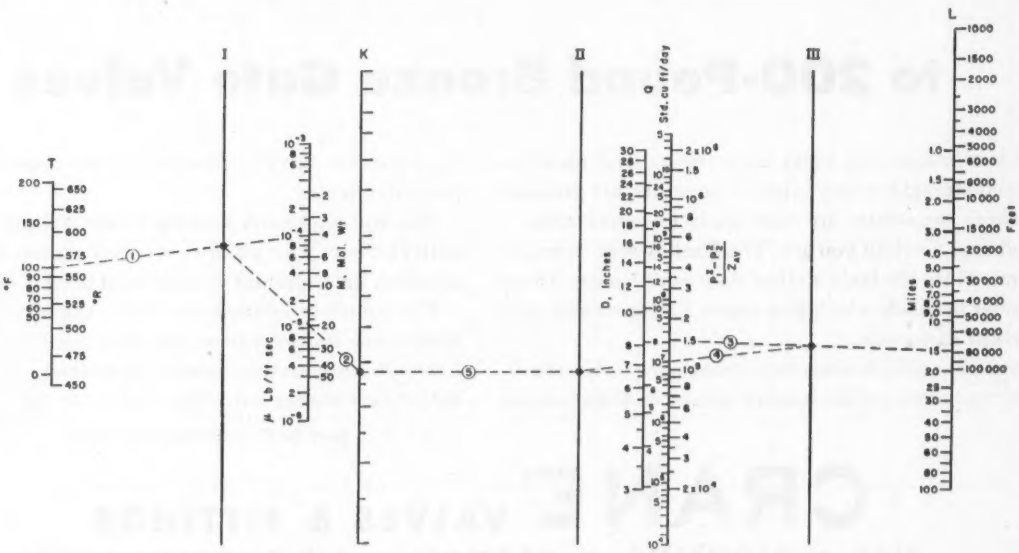
Connect 15 on L and $1.5(10)^5$ on the scale for $(P^2_1 - P^2_2)/Z_{av}$ and mark intersection with axis III. Extend a line from this intersection through 10^7 on Q scale to meet axis II.

Extend line from intersection found on K axis through intersection on axis II to meet D scale in desired value of 6.7 inches.

LITERATURE CITED

1) "High Pressure Pipe Line Research," Project 49, Clark Bros. Co., Inc., Olean, N.Y., (1942).

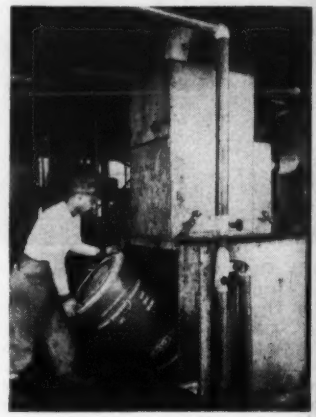
2) VANCE, F. P., AGA Meeting, New Orleans, May 1942.



Conveyor speeds up handling of dye, keeps it clean

Problem: Moving a black dye from one processing step to another in a multi-story building at the Bound Brook, N.J., plant of Organic Chemicals Division of American Cyanamid Company was a time-consuming, wasteful job.

Drums of dye had to be hauled manually across first floor to end of building, where a five-drum-capacity elevator was located. On third floor, drums again had to be hauled by hand to point where dye was gravity-fed to mill on second floor. Production increases caused tie-ups as drums piled up in long waiting lines.



Unground dye is dumped into conveyor for trip to second-floor mill

Further complicating the operation was necessity of keeping dye free from contamination while it was being moved.

Solution: Conveyor which combines feeding, conveying and elevating was installed. Unit comprises a series of solid steel flights connected to an endless chain, enabling material to be moved in a substantially continuous stream through enclosed, dust-tight casing.

Drums of dye are dumped into feeding section of conveyor on first floor. Material is delivered directly into mill on second floor. Here, dye is

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CUT HERE AND FILE

Energy Conversion Chart

JEROME A. SEINER
Pittsburgh Plate Glass Company
Springdale, Pa.

Accompanying chart offers convenient means of converting from one set of energy units to another.

Units included on this chart are: calories, watt-hours, cubic foot-atmospheres, horsepower-hours, foot-pounds, Btu's, liter-atmospheres, joules, and kilogram-meters.

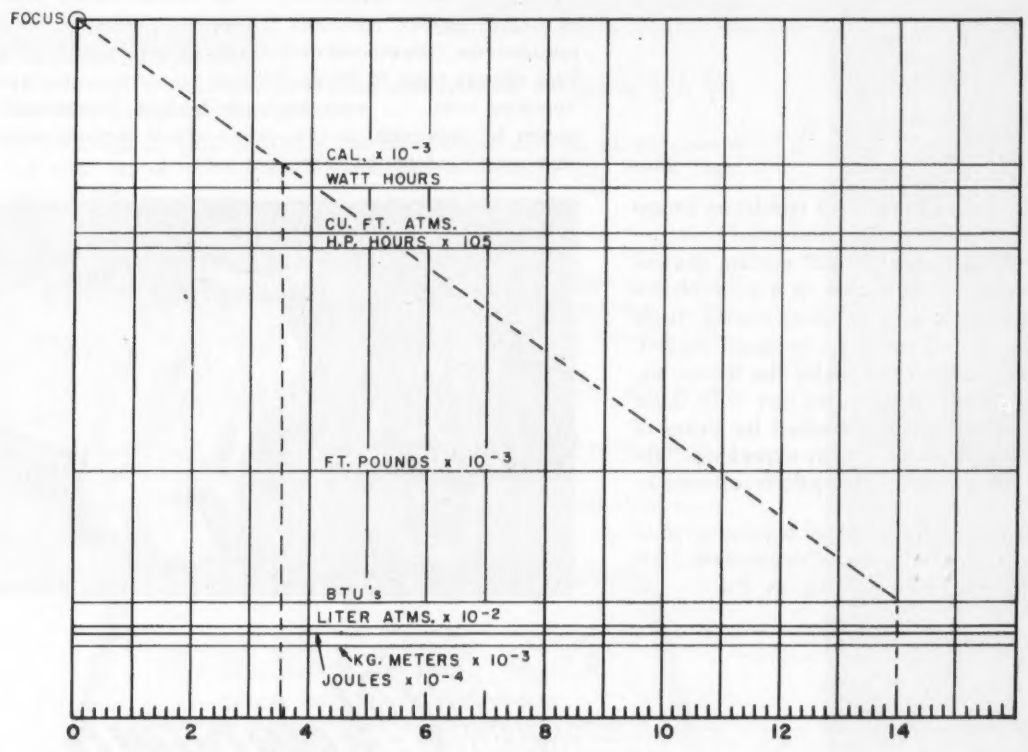
To use, enter horizontal scale of units vertically from bottom at numerical value of quantity to be converted — or at any multiple of ten of this value.

From intercept with horizontal line labeled with original units, draw a line upward to the left through point marked "Focus."

Intercept of this line with any of the horizontal lines gives converted values for those units.

Typical Example

Example shown by dotted lines indicates conversion from 14 Btu to 3530 calories.



From page 48

pulverized to meet pre-determined specifications. It is then gravity-fed into blenders immediately below. Finished dye also is gravity-fed from blenders into waiting drums for weighing, coding, testing.

Results: Conveyor delivers more than twice amount of dye handled by elevator. New operation has halved manpower requirements in this phase of operation. Enclosed, dust-tight conveyor casing has eliminated losses from contamination, reduced housecleaning. Threat of major bottleneck on hauling drums has been removed.

("Flow Master" conveyor was manufactured and installed by Gifford-Wood Company, Hudson, N.Y.)

Check 3598 opposite last page.

Unitizing paraffin slabs slashes loading time and eliminates loss

Problem: It took three men three hours to hand-load a freight car of fragile, individual slabs of paraffin wax at the Philadelphia, Pa., plant of The Atlantic Refining Company. Method resulted in considerable breakage and posed threat of contamination. In addition, customers found unloading of single slabs slow.

Solution: Company, in cooperation with manufacurer of steel strapping, developed system by which stacks of paraffin slabs are packaged in two- or three-piece corrugated containers mounted on expendable pallets. These pallets and cartons are unitized and reinforced with four tensioned and sealed straps.

Slabs are stacked on bottom cap of container, which rests on expandable pallet, and are moved by lift truck to strapping area. There, the remainder of carton is placed over stack of slabs.

To page 52

For more information on product at right, specify 3599 . . . see information request blank opposite last page.

LADISH

Controlled Quality

LIGHT WEIGHT
WELDING NECK
FORGED FLANGES
125 POUND

TO MARK PROGRESS

Reduce cost... eliminate breakage of cast flanged-end piping components when bolting to steel welding neck flanges

PIPING PROBLEM:

(1) Difficulty experienced in making pressure tight connection with flat face flanges with full face gaskets.

(2) Breakage of relatively brittle cast iron flanged ends on valves, pumps and other piping components when bolted to standard 1/16" raised face steel flanges.

LADISH SOLUTION:

The 125 pound Light Weight flange developed by Ladish is an ideal solution to this problem . . . for not only does it solve the problem . . . but it provides significant additional advantages of cutting purchase costs and reducing weight.

You can depend on Ladish for leadership in introducing piping developments to reduce cost and improve service.

A national network of distributors, Ladish plants and sales offices is ready to serve you.

Specification sheets on Light Weight Flanges and Welding Fittings available on request.

POSITIVE, LEAK-TIGHT JOINTS

Proven design principle of raised face flange has been adapted to assure a completely safe, positive connection to class 125 cast iron flat face flanges.

ELIMINATES NEED FOR HEAVY FLANGED ENDS ON VALVES AND PUMPS

No longer is it necessary to pay a premium to obtain the heavier flanged end valves, pumps and other piping components required to withstand bolting to raised face steel flanges in a welded piping system.

LOW WEIGHT—AMPLE STRENGTH

Light cross section design reduces weight to 30-50 per cent of ASA 150 pound Welding Neck Flange . . . still possesses ample strength to assure safe, leak-tight joint with mating cast flange.

LOWER COST

Savings in purchase price of Light Weight flanges are supplemented by additional savings realized by selecting valves on the basis of pressure rather than strength characteristic of flanged ends.

EASE OF INSTALLATION

Adequate welding neck type hub length keeps welding heats safely from flange. Prevents unpredictable warpage and deformation. Light weight facilitates handling, speeds positioning and installation.

MINIMIZES PIPEFITTER PRECAUTIONS

Safe and suitable for use with either carbon or alloy steel bolting . . . either full face or ring gaskets, in 1/16" or 1/8" thicknesses.

PRESSURE-TEMPERATURE RATING

Rating corresponds to ASA B16.1 class 125 cast iron flanges...125 PSI (gauge) saturated steam; 175 PSI (gauge) water, oil or gas at 150° F.

SERVICE APPLICATIONS

Widely accepted for low pressure piping in gas distribution service . . . utility services such as water, heating, air conditioning, refrigeration . . . pumps and compressors.

TO MARK PROGRESS

LADISH CO.

CUDAHY (Milwaukee Suburb) WISCONSIN

SALES OFFICES: Amarillo • Atlanta • Baton Rouge • Buffalo • Calgary
Chicago • Cincinnati • Cleveland • Denver • Havana • Houston • Los Angeles
Mexico City • Montreal • New York • Odessa • Philadelphia • Pittsburgh
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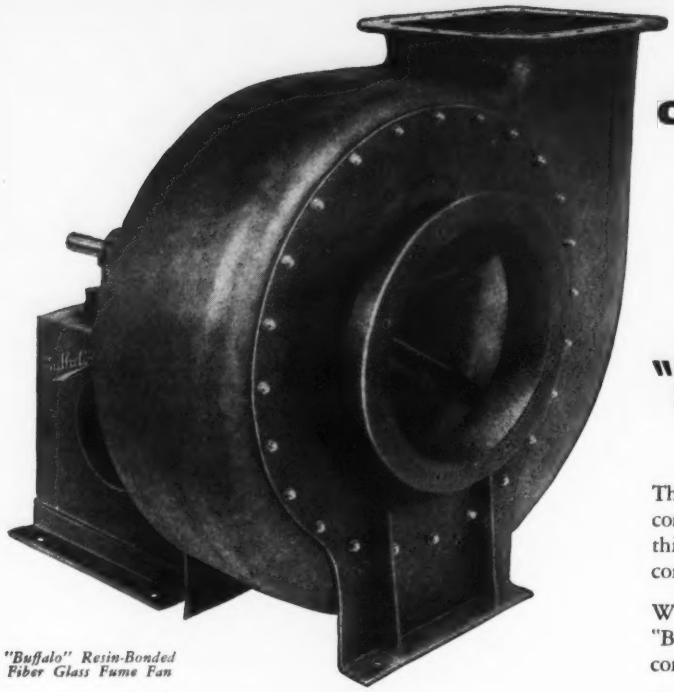
SAW BLADES • PIPE FITTINGS • DROP FORGINGS • RINGS • VALVES

LADISH...THE FITTINGS LINE THAT OFFERS COMPLETE SERVICE IN TYPES, SIZES AND MATERIAL SPECIFICATIONS

WELDING FITTINGS	ASA & MSS FLANGES	SCREWED & SOCKET FITTINGS & UNIONS	LONG NECKS	LARGE DIAMETER & T.E.M.A. FLANGES



"Buffalo" Resin-Bonded Fiber Glass Fume Fan

CORROSION-CONTROL PROBLEMS?

SOLVE THEM WITH THESE SPECIAL "BUFFALO" UNITS

The broad line of "Buffalo" equipment for corrosion control, plus our 80 years of engineering experience in this field, insures you of the most effective solution of your corrosive fume problems.

Whatever your specific needs, you will find the *right* "Buffalo" product with the *right* protective coating and/or corrosion-resistant parts to fill that need.

Contact your nearby "Buffalo" Engineering Representative, or write us outlining your problem. We will be glad to provide you with a prompt, practical, economical solution.

"Buffalo" Type "FG" Fume Fans provide superior chemical resistance to a wide variety of corrosives, including acids, salts, gases, organic materials. Temperature applications range up to 225°F.

The fan housing is formed of resin-bonded fiber glass. All exposed areas of the carefully-balanced steel rotor are encased in thick fiber glass. The "FG" is available in standard capacities up to 34,000 cfm at pressures to 10" static.

For full details, including chemical resistance table, write for Bulletin FI-511.

"Buffalo" Cast Iron Exhausters, widely-used throughout the chemical process industries, are engineered to operate under the most extreme corrosive conditions.

Husky cast iron housings, plus cast inlet cones with integral inlet vanes, guide air smoothly into the wheels. The result is the low-turbulence air flow inherent in this high-efficiency design. Non-overloading is insured, regardless of system pressure.

Three arrangements are available: direct motor drive, separate belt drive or a package unit with adjustable pitch V-belt drive and motor mounted on adjustable base rails.

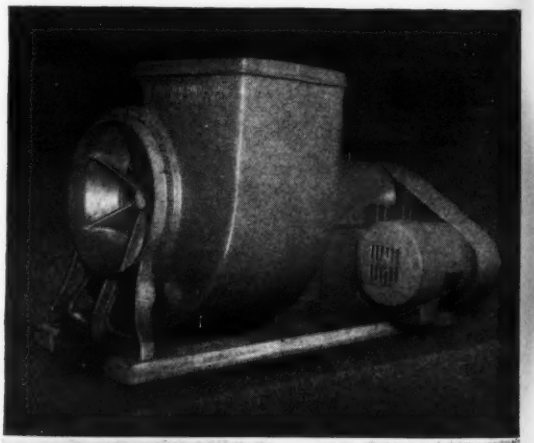
For full information on "Buffalo" Cast Iron Exhausters, contact your nearest "Buffalo" Representative or write us direct.

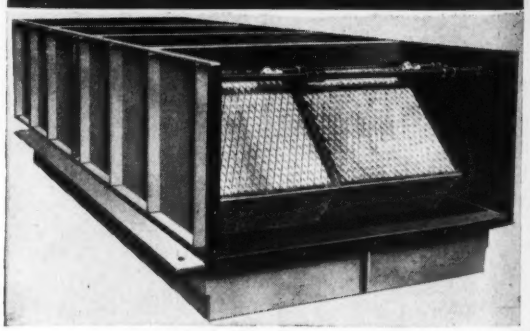
"Buffalo" Gas Absorbers are designed for highly efficient removal and/or recovery of soluble gases, vapors and mists from exhaust systems before discharge to the atmosphere. Absorption is accomplished when the contaminant is completely in solution. This is accomplished by means of an absorbent liquid sprayed on a series of fiber cells.

Field performance tests prove that efficiency of "Buffalo" Gas Absorbers ranges up to 99.8%. Applications fall into two categories: removal of low concentrations from stack gas effluents for prevention of atmospheric pollution, and the absorption of process or off-gases containing sufficient material to make reutilization economically feasible.

Bulletins AP-225 and AP-2500 will guide you to the proper "Buffalo" Gas Absorber to solve your contamination problem. Write for it today.

EVERY "BUFFALO" PRODUCT FEATURES THE "Q" FACTOR — the built-in Quality which provides trouble-free satisfaction and long life.





Top *"Buffalo" Cast Iron Exhauster*

Bottom *"Buffalo" Gas Absorber*

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING
FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Check 3600 opposite last page

Polyurethane Reaction

M. J. CRAMER
919 N. Pasadena
Azusa, Calif.

Glycol derivatives and isocyanate derivatives react to produce polyurethane polymers. Percentage completion of reaction can be followed by titration of unreacted isocyanate group with 0.5N hydrochloric acid.

The equation:

$$100 - \frac{\text{(Batch Wt) (Titration Vol Diff) (N) (Equiv Wt)}}{\text{10 (Sample Wt) (Wt of Isocyanate)}}$$

gives percentage reaction. Total batch weight, weight of isocyanate added to batch, equivalent weight of isocyanate, and normality of acid are known.

Test procedure is performed by weighing a sample, adding 25 ml of dioxane-dinormal butyl amine and 25 ml of acetone or other solvent systems, and then titrating. A blank sample is titrated also.

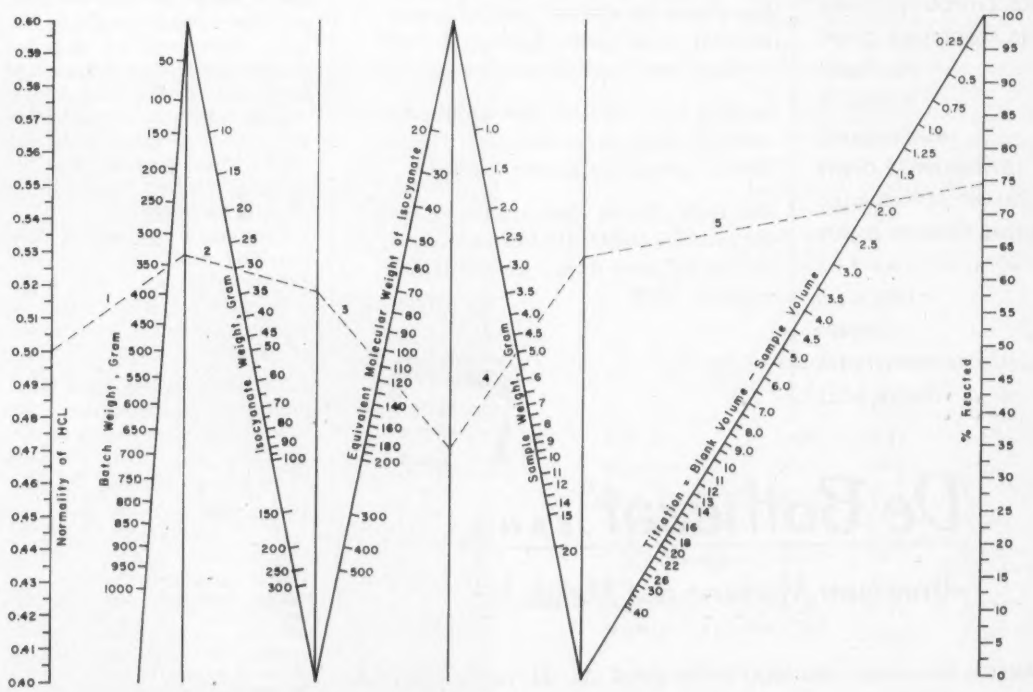
Nomograph allows calculation for different size batches and different isocyanates of different equivalent weight. For large series of tests on same large batch over a period of time, a constant point will be obtained at the end of Step 3 so that the first three steps need not be repeated for each sample.

For batch larger than 1000g, batch weight and isocyanate weight can be divided by same factor to keep within range of chart.

Typical Example

Broken line shows steps in sequence: A 350-g batch of polypropylene glycol and an isocyanate are mixed. Thirty g of isocyanate are used — equivalent molecular weight is 110. Half-normal acid is used to titrate a 5-g sample after three hours.

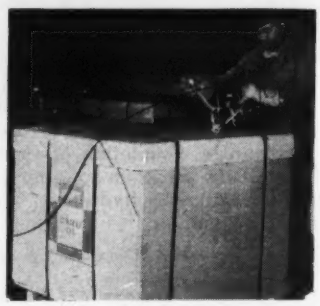
Difference in titration for a blank and sample is 2 ml. Percentage completion of reaction is read as 74.5%.



NEW SOLUTIONS

From page 50

Two lengths of steel strapping, fed from coil in portable reel stand, are positioned top and bottom around unit at ends and sides. Corner protectors are placed beneath strapping at all eight edges of container. Strapping is tensioned, sealed, and cut by a



Steel strapping tool being used by operator tensions, seals, and cuts steel straps around corrugated carton containing slabs of paraffin wax

tool that combines all of these functions. Lift trucks then move packaged unit to shipping platform or to storage.

Results: Now it takes only 15 man-minutes to load freight car with unitized slabs. Breakage of slabs has been reduced, and loss through breakage has been eliminated by shipping in containers. Wax is protected from dirt, grease, and dust.

This latter is of particular value because many slabs are used in food processing applications, where cleanliness is of vital importance.

Customers' unloading and handling problems have been considerably eased, and product is arriving at destination in better condition than under old system.

(Packaging system uses ¾" x .020" steel strapping and a 206 Steelstrapper, products of Acme Steel Co., 135th St., and Perry Ave., Chicago 27, Ill.)

Check 3603 opposite last page.

Plastic producing facilities, recently developed, are illustrated and discussed in brochure which includes among other things examples of injection molding. Write to Madan Plastics, Inc., 370 North Ave., Cranford, N. J.

Check 3604 opposite last page.

Sandwiches should be less expensive in the future . . . urethane foam sandwiches, that is. High raw material cost, a major block in road to expanding rigid foam applications, may soon shrink as . . .

Sorbitol Polyethers Lower Rigid Foam Cost 28%

Uses: A group of polyethers that are expected to replace more costly polyesters in rigid polyurethane foam manufacture including foams prepared by the "one shot" technique.

Features: Foam raw materials could reduce foam ingredient cost by amounts ranging up to 28%.

Prices of commercial polyesters used in rigid urethane foams range from 50 to 70c per pound. Ingredient cost of a foam containing 60% polyester and 40% toluene diisocyanate, for example, would be 74c per pound, assuming costs of 70 and 80c per pound for polyester and toluene diisocyanate respectively.

A comparable foam containing 60% of one of these recently introduced sorbitol-based polyethers (Atlas G-2410) and 40% toluene diisocyanate would have an ingredient cost of 53c per pound. This is assuming a proposed cost of 35c per pound for sorbitol derivative.

(Water and catalyst, being minor components, were neglected in making these estimates.)

Description: These polyethers are based on sorbitol, a white crystalline solid hexahydric alcohol. Experimental reaction products of propylene oxide and sorbitol were prepared having hydroxyl numbers varying from 70 to 490. End products are pale to colorless free-flowing liquids soluble in a variety of solvents.

Usefulness of these resulting products arises from their high functionality, comparable to that of branched polyesters. They are not as viscous as the polyesters, making them easier to handle. They do not contain hydrolyzable ester linkage.

To next page

◀ Rigid urethane foam is strong, lightweight, quick-setting

Typical Sorbitol Polyether Analyses

	2410	2421	2424	2428
Acid No.	0.34	0.47	0.67	0.79
Hydroxyl No.	493	260	146	93
Color (Hess-Ives)	2	1	1	1
Ash content, %	0.01	0	0.004	0
Water, %	0.10	0.15	0.15	0.12
pH	6.0	5.9	6.0	5.6
Iodine No.	0.39	0.35	1.12	4.04
Mol wt	760	1340	2500	4830

Check 3606 opposite last page

CHEMICAL MATERIALS

From preceding page

To demonstrate use of these compounds in urethane foams, a number of foam formulas were developed using G-2410 with a hydroxyl number of 490.

In a typical laboratory scale Freon-blown formulation, a prepolymer was first prepared. The following ingredients were maintained at 70°C for one half hour while stirring

	grams
G-2410	403.8
TDI (80/20)	1036.0

During the preparation of the prepolymer the ingredients were stirred under an atmosphere of dry nitrogen.

To prepare the foam, the Freon-11 was first dissolved in the prepolymer in the following proportions:

	Parts by wt
X-520 silicone*	0.5
Prepolymer	100.0
Freon-11**	25.0

*Union Carbide Corp.
**E. I. du Pont de Nemours & Co.

In a separate vessel the following materials were mixed by high speed stirrer:

	Parts by wt
G-2410	76.0
Dabco catalyst*	1.5

*Houdry Process Corp.

Parts A and B were then stirred together and poured into a waxed box. Foaming occurred, due to the vaporization of the Freon. The resulting foam was white, had small, uniform cells, and a density of approximately 2 pounds per cubic foot.

In an experimental machine preparation of a foam (the "one shot" technique), following three streams were fed to the mixing head:

	Parts by wt
1. TDI (80/20)	82.0
G-2410	100.0
2. M-1 catalyst*	0.2
Water	2.9
3. Dabco catalyst**	0.2
X-520 silicone***	0.5

*Metal & Thermit Corp.
**Houdry Process Corp.
***Union Carbide Corp.

The resulting foam was tough, of uniform cell size, and had a density of approximately 3 pounds per cubic foot.

(Sorbitol polyethers are products of Atlas Powder Co., Wilmington 99, Del.)

Check 3607 opposite last page.

THAT'S INTERESTING

Solar sails in the sunset

Just as Christopher Columbus set sail for the new world, so may future explorers venture into the outer reaches of space. Solar-sail-propelled space ships are being studied by Los Alamos scientists. By using the pressure of solar radiation reflected by a large thin sail, extra-orbital propulsion could be obtained in the almost perfect vacuum of space. The sail would be made from extremely thin plastic film coated with evaporated aluminum. A space ship of 1000 lb would require a sail ¼ mile in diameter, and could conceivably navigate to Mars and back in about 2½ years.

Poof!

A plasma gun has been developed which generates a temperature of 36,000°F, high enough to vaporize any known element.

For more information on product at right, specify 3608 see information request blank opposite last page.

Symbolized here is the uncontrolled (multi-point and premature) surface ignition on hot engine deposits that results in abnormal pressure rise and engine noise in some high-compression automobile engines. Driving conditions breed a problem too. Start-and-stop driving that builds excessive deposits is prime offender.

ATTACK ON A NEW KIND OF ENGINE KNOCK...

Celanese compounds modify engine deposits, improve combustion, reduce noise

Two great industries face a real problem in uncontrolled combustion—which results in a rumbling vibration in the higher compression engines of some of today's automobiles. This new kind of engine knock not only disturbs car owners — it puts limits on compression ratios, gasoline composition, and potential engine efficiency.

Among fuel additives researched to combat abnormal combustion, only the organo-phosphorus compounds have been able to help; they modify the composition of hot engine deposits, thus control surface ignition, and reduce excessive pressure and engine "screaming."

Since the first phosphorus additives were introduced into motor fuels a few years ago, Celanese has been a leading supplier to a growing number of gasoline refiners. And indeed, phosphates — which we have been producing for 35 years—are only one member of a huge family of Celanese chemicals basic not only to the automotive and petroleum industries but to scores of others as well.

Whatever *you* produce, whatever your problem, perhaps there is some way in which we can serve you, too. Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Ave., N.Y. 16.

Celanese®

Basic reasons .....

Acids	Functional Fluids	Polyols
Alcohols	Gasoline Additives	Plasticizers
Aldehydes	Glycols	Salts
Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers

Celanese CHEMICALS

.....for improved products

Agricultural	Paper
Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coating
Electrical	Textiles

Export Sales: Amcel Co., Inc., and Pan Amcel Co. Inc., 180 Madison Avenue, New York 16, N.Y. • Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver

CHEMICAL MATERIALS

Obtain crystal clarity in vinyls with this BaCd stabilizer

Product resists yellowing and plate-out

Uses: Stabilizer for vinyl resins. It is compatible with all commonly used plasticizers. It is particularly suitable for calendered and extruded products.

Features: Compound provides vinyls with crystal clarity, free from color even under severe heat and light exposure.

Description: Barium-cadmium stabilizer is a clear, light yellow liquid with a specific gravity of 0.957. It is miscible in mixtures of hydrocarbon solvents with ketones, esters, and alcohols. General usage level for calendered products is between 2.5 and 3%; for extruded products, 3% based on weight of the resin.

Combinations of plasticizers for special properties do not present stabilization problems. Product may be used with any of the common fillers.

(Invin 91 stabilizer is a product of National Lead Co., 111 Broadway, New York 6, N.Y.)

Check 3610 opposite last page.

Use this PVAc resin where water isn't desirable

Uses: Powdered emulsion can replace liquid vinyl emulsions in paints, adhesives, and dry-mix cements.

Features: Dehydrated emulsion should find wide use wherever presence of water is undesirable.

Description: Spray-dried polyvinyl acetate resin is easily reconstituted by adding water. A white powder, it can be stored indefinitely is unaffected by freezing. It is available at 47c/lb in truckload quantities.

(Darex ECD spray-dried polyvinyl acetate is a product of Dewey and Almy Chemical Div., W. R. Grace & Co., 62 Whittemore Ave., Cambridge 40, Massachusetts.)

Check 3611 opposite last page.

This substituted phenol has antioxidant and germicidal effects

Uses: Product is basically a phenol-formaldehyde resin component.

Features: Incorporation of this resin in varnishes greatly improves resistance of varnish film to water and alkali. Drying time is shortened. In addition, germicidal properties can be used to protect products such as glues. It also is an effective antioxidant in soaps and rubbers.

Description: Compound, p-tert-butylphenol, can be supplied flaked or as a concentrated solution in caustic. Bulk shipments of molten material can be made where required. It is readily soluble in most oxygenated and chlorinated solvents; moderately soluble in aliphatics. Solubility in alkaline solutions is also moderate although it is not soluble in water.

(p-tert-Butylphenol is a product of Stepan Chemical Co., 427 W. Randolph St., Chicago 6, Illinois.)

Check 3614 opposite last page.

Unusually high viscosity and molecular weight mark polybutene

Uses: For adhesives and pressure sensitive tapes, as thickening agent, and as capacitor insulation impregnant. It may also be used in lubricants to improve shear stability and as a viscosity index improver.

Features: Material has unusually high viscosity and high molecular weight. Viscosity is about 20,000 SSU at 210°F.

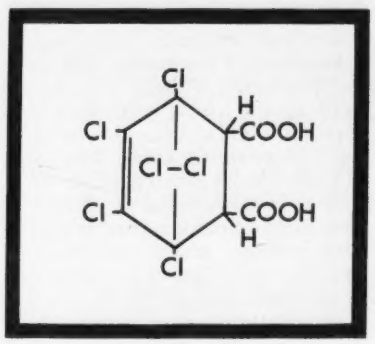
Description: Polybutene product is non-drying, light in color, and stable to sunlight. It is also moisture resistant and thermally decomposes without residue at temperatures above 650°F.

(Indopol polybutene is available from Amoco Chemicals Corp., 910 South Michigan Ave., Chicago 80, Ill.)

Check 3615 opposite last page.

BRIEFS

on a highly chlorinated new intermediate... some phosphorus chemicals for igniting... new booklet on benzoic acid and sodium benzoate... an exhaustive chlorine manual



New intermediate is 54.7% stable chlorine

This is Het® Acid, also known as chlorendic acid. It is a versatile intermediate which undergoes typical dibasic acid reaction.

It's 99.5% pure in the form of fine, white crystals. The stable, high chlorine content makes it exceptionally useful for imparting flame retardance to various derivatives.

Forms salts with a variety of metals. Both mono- and di- sodium salts are easily formed.

Forms esters by the usual methods to produce dimethyl, diethyl, dipropyl, etc. Rate of esterification is quite rapid.

Forms anhydride by dehydration at high temperatures.

Forms amines and *amides.*

Forms resins with glycols and other polyols and with fatty oils to make flame-retardant oil-modified alkyds.

These are just a few of Het Acid's reactions which have commercial interest. For a cursory glance at the whole story send the coupon for technical data sheet or, if you'd like to go into this even deeper, send for our Bulletin 40.

Some things have to burn

Got a product you want to ignite in air—like a firecracker, or a match, or a fuse, or a signal flare?

We make two different chemicals that will help get it started: red phosphorus and phosphorus sesquisulfide.

The red phosphorus is 99.4% pure and ignites in air at 200°C. The particle size is 99% min through 100 mesh.

The phosphorus sesquisulfide is a lemon yellow compound completely free of untrapped phosphorus. It ignites by friction. 90% goes through an 80 mesh screen. 80% goes through 100 mesh.

Technical data on both compounds offered in the coupon.

New booklet on benzoic acid and sodium benzoate

If you would like facts on these two chemical cousins in one compact little booklet, check the coupon for Bulletin 323.

It's chock full of useful data on both Hooker chemicals in both their U. S. P. and Technical Grades.

Free Chlorine manual

If you'd like 76 pages of facts on chlorine, send the coupon for Bulletin 125.

There's a lot of information on the chemical itself, including charts and graphs on its physical properties.

There's lots more on how to handle chlorine safely. Descriptions of equipment and containers should make it easier to run a safe chlorine handling program.

Finally, there is a listing of the advantages you enjoy as a user of Hooker chlorine. Dependable delivery, in scrupulously clean containers, is the important one. But there are many others.

For more information check here and mail with your name, title, company, and address.

- ☐ Het Acid, Technical Data Sheet
- ☐ Het Acid, Bulletin 40
- ☐ Red Phosphorus
- ☐ Phosphorus Sesquisulfide
- ☐ Bulletin 323
- ☐ Chlorine Manual

When requesting samples, please use business letterhead to help speed delivery.

HOOKER CHEMICAL CORPORATION
502 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Sales Offices: Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B.C.

HOOKER CHEMICALS PLASTICS

Check 3616 opposite last page

CHEMICAL MATERIALS

Daylight fluorescent pigments now offered commercially

Eight colors are available

Uses: Pigments for paints, inks, plastics, and coatings for paper or cloth where high visibility or brilliant color is desired. They should be particularly useful in products for safety applications.

Features: Fluorescent pigments actually "reflect" more light of the color used than there is of that color in the light illuminating them. They are now being offered to industry in commercial quantities. Eight colors are available: pink, orange, green, medium orange, red, lemon yellow, cerise red, gold yellow.

Description: Finely powdered brilliant organic pigments fluoresce under ultraviolet or daylight illumination. They have no afterglow. Average particle size is 3.2-3.3 microns. They are insoluble in water, aliphatic hydrocarbons and most aromatic hydrocarbons; soluble is esters, ketones, and ethers. They are compatible with most vehicles.

(Bold daylight fluorescent pigments are available from Lawter Chemicals, Inc., 3550 Touhy Ave., Chicago, Ill.)

Check 3618 opposite last page.

Wide textile use seen for latex that has compatibility

Product's light stability is improved

Uses: For modifying and sometimes replacing natural or chloroprene type latices.

Features: Elastomeric latex is reported to have superior resistance to metal staining, is light in color, has low odor, and improved light stability. Stability of emulsion system and compatibility with other systems should permit wide use in textile processing.

Description: Latex 2582 is based on vinyltoluene and butadiene.

Vulcanization is accomplished following standard

Typical Properties	
Solids content, %	41
Specific gravity (at 25°C)	0.981
Lb/gal	8.3
Latex pH	10.5
Viscosity, cps	25.0
(Brookfield model LV viscometer. No. 1 spindle, 20 rpm)	

practices. Latex is supplied with minimal soap stabilization for maximum formulating flexibility. It is sufficiently stable to permit normal shipping and handling practices.

(Latex 2582 is a product of Dow Chemical Co., Midland, Mich.)

Check 3620 opposite last page.

More fluoroalcohols make their bow in quantity

These compounds promise value as intermediates

Uses: High fluorine content organic intermediates for pharmaceuticals, dyes, surface active agents, plastics, elastomers, coatings, and other chemical products.

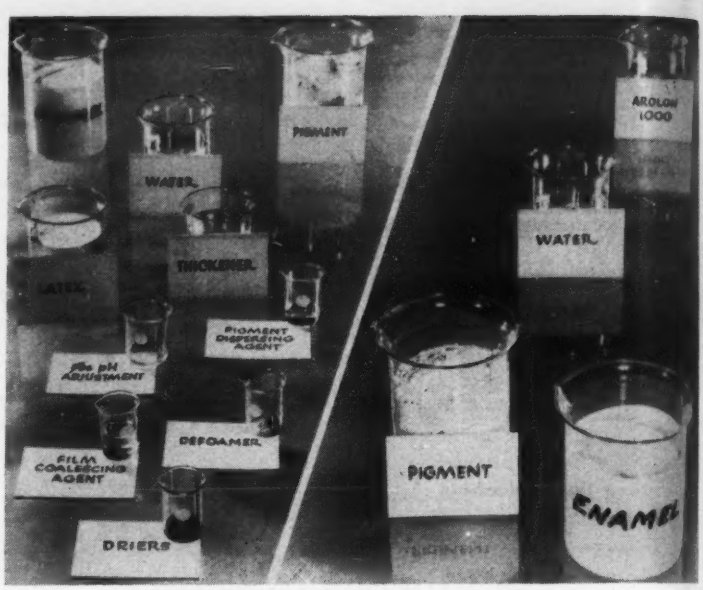
Features: Three new compounds, supplementing other fluoroalcohols introduced earlier (See CHEMICAL PROCESSING, September 1958, page 91), are now available in quantity. High reactivity of compounds should make them valuable as intermediates for many products needing special characteristics provided by fluoro content.

Description: Identified as C7, C9, and C11 fluoroalcohols (technical grade), compounds have a fluorine content varying from 68.6 to 71.4%. Boiling points range from 129 to 181°C at 200 mm pressure. All compounds undergo reactions characteristic of primary alcohols.

Initial price is $40/lb, with long-range possibility of substantial reduction if sufficient demand develops.

(For more information on C7, C9, and C11 fluoroalcohols contact Dyes and Chemicals Div., Organic Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington 98, Del.)

Check 3621 opposite last page.



A recent development in vehicles promises numerous advantages to paint and industrial finish manufacturers

Versatile water- eases formulating,

Uses: A water-soluble resin vehicle for finishes. It is particularly suitable for high-quality baking enamels.

Features: Resin eliminates hazard of flammable solvents, yet retains properties associated with conventional organic-solvent-thinned alkyd-melamine systems. In formulating, no thickeners, resin modifiers, stabilizers, driers, bactericides, wetting agents, or film coalescing agents are required.

Material is so fire safe that its spray will extinguish flame of a blow torch.

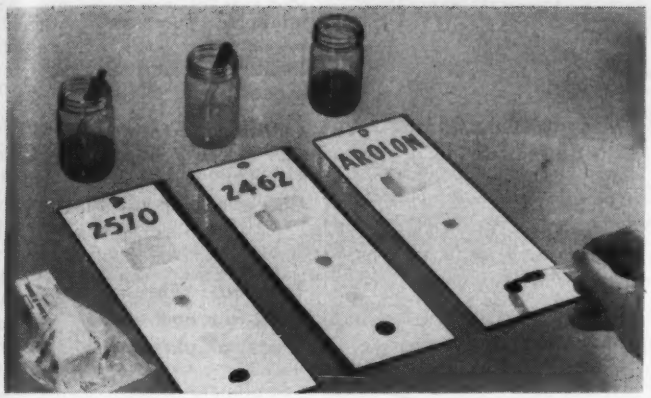
On heating, resin converts to a hard, tough, mar-resistant film. Color retention, gloss retention, and resistance to soap and solvents rival that of melamine-modified coconut alkyds. In addition, resulting film equals melamine-modified short-soya alkyds in adhesion, toughness, mar-resistance, juice and grease resistance, salt spray resistance, and water resistance.

Resin is an efficient grinding vehicle applicable to cus-

Hardness of Resin Film*

Baking schedule Minutes	°F	Sward hardness
20	200	16
30	200	20
40	200	32
20	250	28
30	250	34
40	250	34
20	300	34
30	300	36
40	300	36

*Based on 1.5 mil wet film drawdowns of clear resin at 45% solids on glass, baked without driers or catalysts.



Film formed by water-soluble resin equals conventional films in resistance to butter, fruit acids, and cooking greases

Formulating industrial enamels is simplified with water-soluble resin (right) compared to conventional water-emulsion resin (left)

soluble resin increases safety

tomary pigment dispersing techniques.

Description: Water-soluble resin, Arolon 1000, is a low-viscosity, light colored solution. Being a solution rather than an emulsion it presents no freeze-thaw problem.

A broad range of colored enamels can be formulated. However, compatibility with pigments is more critical than pigment compatibility of solvent-cut resins. Each grade pigment should be carefully checked. Control of pH is important. Paint should be kept alkaline. Addition of basic organic materials, such as amines, for example triethylamine, may assist in stabilizing enamels employing acidic pigments.

Spray application of formulations using Arolon 1000 requires some modifications in standard spray techniques due to the slower rate of water release compared to usual solvents present in industrial finishes.

Specifications

Solids %	45±1
Color, max (Gardner '53)	3
pH	7.5-9.0
Lb/gal (soln)	9.0-9.15
Lb/gal (solids)	10.9
Reduced viscosity C-E	25%±1

Dilution characteristics are somewhat different from viscosity reduction of conventional organic solvent-cut systems. Between 35 and 45% there is little change in viscosity of resin solution. Further addition of water causes

Check 3624 opposite last page

Progress Report...

— New pharmaceutical chemicals

— Hexylene glycol

Modern pharmaceuticals are derived from new chemicals

New chemicals from CARBIDE are finding many uses in the pharmaceutical industry. New low-cost solvents have lowered operating costs, and pharmaceutical companies are using new intermediates in the manufacture of drugs.

Primary amyl acetate is a useful extraction solvent with interesting properties. Its solubility in water is less than 0.2 per cent by weight; it has a narrow boiling range near 150°C.; its vapor pressure at 20° is only 3.8 mm; and the CARBIDE product is nearly 100 per cent in amyl ester content. These properties mean lower volatility losses, reduced losses into the aqueous phase, more efficient extraction, improved solvent recovery, and higher yields of the extracted product. The savings realized from the use of the new primary amyl acetate have established this CARBIDE product as a choice penicillin extractant; and this unique extractant shows promise for use with other antibiotics and steroids.

Primary amyl alcohol is a solvent which, like primary amyl acetate, has a high boiling point, low solubility in water, and is a pure mixture of primary C_5 alcohols. Primary amyl alcohol is used as a purification, recrystallization and extraction solvent.

Propionic acid, produced by CARBIDE from propionaldehyde, is a quality intermediate for drugs, hormones, and fungicides. Propylene glycol dipropionate is an effective fungicide, and zinc propionate is used in the treatment of ringworm and athletes foot. Propionyl salicylic acid is an antirheumatic, and triphenin (propionyl phenetidine) is an antipyretic.

2-Methylpentaldehyde, a derivative of propionaldehyde, is an intermediate for Meprobamate, one of the important tranquilizing drugs.

Propionaldehyde is an intermediate for Tetronal soporific and *propionic anhydride* is used as an intermediate for propiophenone, propionates, and related drug intermediates.

Butyric acid is an intermediate for the preparation of anti-thyroid drugs and bronchial antispasmodics.

Isobutyraldehyde is a CARBIDE product used in preparing pantolactone, pantothenic acid, and calcium pantothenate.

These are some of the established pharmaceutical uses for CARBIDE's new products. Each is characterized by high purity, assured through careful quality control and rigid specifications. New products which should find use in this field include –

- 1-Pentanol (99+% straight-chain, primary alcohol)
- 2-Methyl-1-butanol
- Valeric acid
- 2-Methyl pentanoic acid
- *iso*-Pentanoic acid (mixed isomers)
- *iso*-Decanoic acid (mixed isomers)
- *iso*-Pentaldehyde (mixed isomers)
- Valeraldehyde
- 2-Methyl-1-pentanol
- *iso*-Hexanol (mixed isomers)
- 2,2,4-Trimethyl-1-pentanol
- 2,2-Dimethyl-1-butanol
- *iso*-Eicosanol (mixed isomers)
- 2,2-Dimethyl-1,3-propanediol
- 2-Methyl-2-ethyl-1,3-propanediol
- 2,2,4-Trimethyl-1,3-pentanediol
- 2,2-Dimethyl-1,3-butanediol
- Ethyl-3-formyl propionate
- Ethyl-4-formyl butyrate
- Ethyl-3-formyl-2,5-endomethylene cyclohexane carboxylate
- These new chemical intermediates are available in less drum quantities for your use in research and development.

Blending liquid systems or improving latex paints?

Most systems comprised of oils and liquids that are ordinarily difficult to blend can be effectively coupled by the addition of hexylene glycol (2-methyl-2,4-pentanediol). Industrial cutting oils, soluble oils, liquid detergents, drycleaning soaps, and emulsions are representative of mixtures that become miscible with the aid of hexylene glycol.

The inclusion of hexylene glycol in alkyd-modified styrene-butadiene latex paint formulas permits a higher pigment volume concentration and improved leveling with brush or roller. The paint film gains extra scrub resistance, better hiding properties, and less yellowing at a lower cost per pound of solids.

Hexylene glycol improves the solubility and penetration of textile oils, paper coatings, and leather dressings.

Check 3625 opposite last page

Lacquer-type inks, and both specialty and standard inks based on resins insoluble in ethylene glycol or diethylene glycol, can be formulated with hexylene glycol. Its evaporation rate is also of benefit in fast-drying and steam-set inks.

Hexylene glycol helps to reduce particle size and to prevent agglomeration during grinding operations involving silicious materials or Portland cement. A more uniform aggregate is obtained, while valuable time is saved.

Other important uses of hexylene glycol are in the synthesis of sulfolanes, esters and diesters. A 62-page booklet, "Glycols," contains properties and other facts about hexylene glycol together with profitable information about CARBIDE's other glycols. Check the coupon for a copy.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ "Glycols" booklet. ☐ Send address of the nearest Carbide office.

Name_____

Company_____

Street_____

City_____ Zone_____

State_____

And remember, there is a CARBIDE sales office near you where you can obtain the services of a CARBIDE Technical Representative. His wide industry experience is backed both by extensive chemical training and by Technical Specialists.

"Union Carbide" is a registered trade-mark of Union Carbide Corporation.

UNION CARBIDE CHEMICALS COMPANY

DIVISION OF UNION CARBIDE CORPORATION

viscosity to decline sharply. Solution is pre-stabilized to minimize corrosion. Normal precautions, such as use of lined cans and drums, are suggested.

(Arolon 1000 is a product of Archer-Daniels-Midland Co., Minneapolis 40, Minn.)

Check 3626 opposite last page.

Treated-Teflon bonders hold to wood, steel, glass, or plastics

Two-component adhesives can cure at room temp

Uses: Cementing bondable Teflon to itself or to other materials.

Features: Adhesives will bond etched Teflon to wood, steel, glass, aluminum, ceramics, plastics, or any material that will bond with an adhesive. They can be cured at room temperature or at elevated temperatures.

Description: Two products are offered: First (R-86009), is recommended where some flexibility in bond is required. It has good resistance to water and most chemicals. Second (R-86044), has excellent resistance to acids (except acetic) as well as water and other chemicals. It can be used as a structural adhesive at temperatures up to 200°F.

Both materials are two-component systems. They are prepared by mixing base and activator in specified amounts. Pot life for R-86009 is two hours. For R-86044, pot life varies from 40 min for a 100-gram batch to 20 min for a 600-gram batch. Cooling extends this time.

(Ray-Bond R-86009 and R-86044 are products of Adhesives Dept., Raybestos-Manhattan, Inc., Bridgeport 2, Connecticut.)

Check 3627 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Medium nitrile rubber is easy processing elastomer

Has good qualities of low, high temp products

Uses: Product is suitable for those applications where oil, fuel, and solvent resistant characteristics of nitrile rubber are needed.

Features: Easily processed nitrile rubber offers better physical properties and improved process characteristics of low-temperature polymers while retaining excellent molding qualities of rubbers polymerized at high temperatures.

Description: Cold, medium nitrile is stabilized with a non-discoloring antioxidant.

Mooney visc ML 4' (@ 212°F)	53
Solubility in MEK, %	99
Ash, %	0.40
Moisture, %	0.02

Compound mixes readily with other compounding ingredients. It is stable at normal processing temperatures and can be handled by normal rubber storage procedures.

(Chemigum N600 medium nitrile rubber is a product of Chemical Div., The Goodyear Tire & Rubber Co., Akron 16, Ohio)

Check 3628 opposite last page.

Wall chart lists properties, applications, and recommended treatment levels for 22 industrial fungicides. Feature of chart consists of readily usable conversion tables for quickly computing fungicidal concentrations for various applications. Wall Chart — Nuodex Products Company, Division of Heyden Newport Chemical Corporation, Elizabeth, N. J.

Check 3629 opposite last page.

Paraffin waxes, both microcrystalline and fully refined, are described in 16-page technical bulletin which includes properties, testing methods, and packaging. Nineteen data charts are used. Tech Bul 22 (Revision 2) — Industrial Products Dept., Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pa.

Check 3630 opposite last page.

CHEMICAL MATERIALS

Metal coating acrylic forms finish that's durable, glossy

Stable pigment dispersions, good adhesion obtained

Uses: An acrylic resin for metal coatings. Primary use has been in automotive lacquers.

Features: Product dries rapidly to clear, colorless film. Product shows outstanding pigment dispersion stability as well as gloss and fullness of polished films. In both air-drying and baking types of lacquer top coats, adhesion over a great many different surfaces is excellent.

Description: Coatings containing this acrylic can be reduced with aromatic solvents, ketones, and esters.

Physical Properties

Solids, %	30 ± 5
Lb/gal	7.85

Solvents 90/10: toluol/butanol

Acrylic resin is a clear, colorless liquid. It is compatible with a wide range of monomeric plasticizers. Two that have been most completely evaluated are butyl phthalate and dibutyl phthalate.

(Acryloid A-21 is a product of Rohm & Haas Co., Washington Sq., Philadelphia 5, Pennsylvania.)

Check 3634 opposite last page.

Catalyst supports show mechanical strength, chemical inertness

Uses: As catalyst supports in refining of petroleum products.

Features: Material has demonstrated good mechanical strength and chemical inertness.

Description: Mullite pellets are thermally fused spheres of combined alumina and silica, manufactured to the mineral formula of mullite - 3_2Al_3O . 2 SiO_2. In down-flow fixed bed reactors, these chemically inert pellets are used to support the catalyst beds, thereby preventing excessive pressure drop across the bed from an

accumulation of catalyst fines at the outlet of the reactor.

Pellets are available as irregular spheres in three standard size ranges: ½" to ⅞", ⅝" to ⅞", and ½" to ¾". Special graded materials of ⅛" variation are available within the limits of ¼" to ⅞". They are also available as mullite chips of 3-6 mesh and 6-10 mesh.

(Mullite pellets are product of Davison Chemical Co., Div. of W. R. Grace & Co., Baltimore 3, Maryland.)

Check 3637 opposite last page.

Accelerator price break permits use in resins of polyester-styrene

Uses: Accelerating the cure of polyester-styrene resins.

Features: Heretofore available only as a highly refined product, compound is now available in a technical grade priced to make use as accelerator economically feasible with polyester-styrene resins in low pressure laminating applications. Price is $1.55/lb in drum quantities.

Description: Accelerator is N,N-dimethyl-p-toluidine. Amount required varies from 0.001 to 0.1% depending upon desired rapidity of cure. Most general purpose polyester-styrene resins will gel in approximately one minute at room temperature with use of 0.1% DMT and 1% benzoyl peroxide. Product is suitable for use as an accelerator in most peroxide-catalyzed reactions conducted in non-aqueous media.

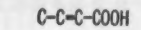
(Accelerator DMT is available from Wallace A. Erickson & Co., 842 N. Wells St., Chicago 10, Illinois.)

Check 3638 opposite last page.

Terpene polymers, pale, non-yellowing products, available in solid or solution form, are subject of eight-page bulletin. Physical and chemical properties are emphasized, and chart covers compatibility, solubility, and viscosity. Application chart for various grades is included. "Piccolyte Resins" — Pennsylvania Industrial Chemical Corporation, Clairton, Pa.

Check 3639 opposite last page.

Eastman Briefs
FOR FEBRUARY



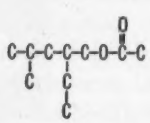
Crotonic Acid

Form ..... *crystalline solid*
Crystallization Point ..... *not less than 65°C*
Purity ..... *not less than 97%*

If you're working with alkyds, take a good look at this highly reactive unsaturated acid. Reports are that it makes excellent fast-drying resins. Insecticide chemists have also shown considerable interest.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B1



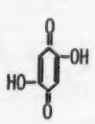
2-Ethylisohexyl Acetate

Form ..... *liquid*
S. G. 20°/20°C *0.865-0.870*
Boiling Range, 760mm. ..... *186-195°C*

Here's a new ester solvent with a very low evaporation rate and very low water solubility—a valuable combination of properties for multicolor lacquer and emulsion formulations, for instance.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B2



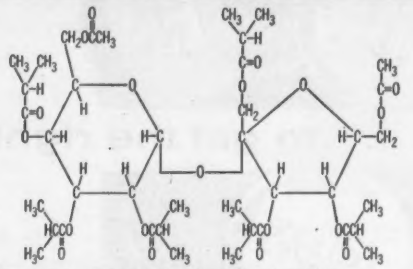
2,5-Dihydroxybenzoquinone

Form ..... *solid*
Melting Point ..... *216°C (Decomposes)*
Quality ..... *Technical grade*

From metal chelating to insecticide manufacture anyone interested in quinone compounds will find this one easy to work with—decidedly more stable than most and less irritating to skin and eyes.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B3



Sucrose Acetate Isobutyrate

In case you didn't receive an announcement, we have a healthy[1] new arrival at our place. Adhering strictly to family tradition we named this compact newcomer Sucrose Acetate Isobutyrate—SAIB, for short. Quite a mouthful, but then a perfectly clear young chemical[2] that empties a hot bottle in seconds[3] and yet is spooned at room temperature[4] deserves an impressive title.

We're not sure yet just what the future holds for our latest addition. Extremely stable character traits[5] and early behavior patterns[6] indicate a career in the coatings field. A smooth operator here, its ability to lower operating temperatures of hot melts, and increase the nonvolatile content of a lacquer without disturbing the viscosity or bothering film hardness might be a definite asset.

On the other hand we do not intend to limit young SAIB. We will continue to provide guidance and assistance, particularly during the early years; but anyone with opportunities who is interested in adoption should contact us immediately. We'll be more than glad to arrange an introduction and supply you with a complete case history.

[1] *Molecular weight is 838.*
[2] *Maximum Gardner Color is 2.*
[3] *Viscosity is 90 Centipoises at 100°C.*
[4] *Viscosity is 100,000 Centipoises at 30°C.*
[5] *Resistant to heat and hydrolysis.*
[6] *Compatible with most resins, oils and waxes.*

Eastman Chemical Products, Inc.
Kingsport, Tennessee **B4**

Chemicals Division BP
Eastman Chemical Products, Inc.
subsidiary of Eastman Kodak Company
Kingsport, Tennessee

Please send more data on these chemicals:

B1 ☐ B2 ☐ B3 ☐ B4 ☐

Name _____

Title _____

Company _____

Address _____ Zone No. _____ State _____

ADVERTISEMENT — CLIP AND FILE

Check 3641 opposite last page

CHEMICAL MATERIALS

Hardening agents not needed in epoxy compounds

Stability at room temperature is maintained

Uses: Impregnation of transformers and coils (unfilled compounds); and encapsulation of transformers, strain-sensitive toroidal coils, capacitors, and complete circuits (filled compounds).

Features: Compounds are ready to use without addition of hardening agents. They offer extended stability at room temperature.

Description: Single-component epoxy compounds are available as both filled and unfilled systems. They offer several degrees of flexibility, and heat resistance exceeding 150°C.

(Hysol 6700 Series single-component epoxy compounds are products of Electrical Insulating Division, Houghton Laboratories, Inc., Olean, N.Y.)

Check 3642 opposite last page.

Eliminates foam build-up in vinyl-acetate-based paints, coatings

Uses: Liquid defoaming compound for vinyl acetate formulations.

Features: Compound is claimed to be an efficient and inexpensive means of eliminating foam during manufacturing and application of vinyl-acetate-based paint and coatings.

Description: Liquid defoaming compound for vinyl acetate formulations is 100% active. In most applications, a concentration of 0.1% by weight is sufficient to handle the average foam problem. Compound will also eliminate foam build-up in emulsion and suspension polymerization of polyvinyl acetate, polyvinyl chloride, acrylics, and many other reactions.

(Foamtrol #103 is product of Arlen Chemical Corp., 338 Wilson Ave., Newark 5, N.J.)

Check 3643 opposite last page.

Multi-functionality marks rubber additive

Uses: As additive for prolonging rubber life.

Features: Chemical permits compounders to impart to rubber at one time a combination of properties which previously were not available in one rubber additive alone.

Description: Product is non-volatile, staining type combination stabilizer, antioxidant and antiozonant. According to manufacturer, it does not activate the cure of rubber stocks in processing stage. Its use permits for normal rubber processing without fear of premature cure and consequent waste.

Material adds deterioration resistance to unvulcanized retread stock. Tread rubber fortified with product can be stored for longer periods of time, and rubber breakdown from exposure to weather, heat, and ozone is reduced. In its solid state, rubber chemical is blue-brown flaked solid with an average melting temperature of 212°F.

(Wing Stay 100 is product of Chemical Div., The Goodyear Tire & Rubber Co., Akron 16, Ohio.)

Check 3644 opposite last page.

Nitrile rubber adhesives' tensile strength higher with phenolic resins

Uses: Material was developed for pressure sensitive, cold setting, and heat setting nitrile adhesives.

Features: Material makes possible production of nitrile rubber adhesives with good green tack, high tensile strength, and high thermal softening point.

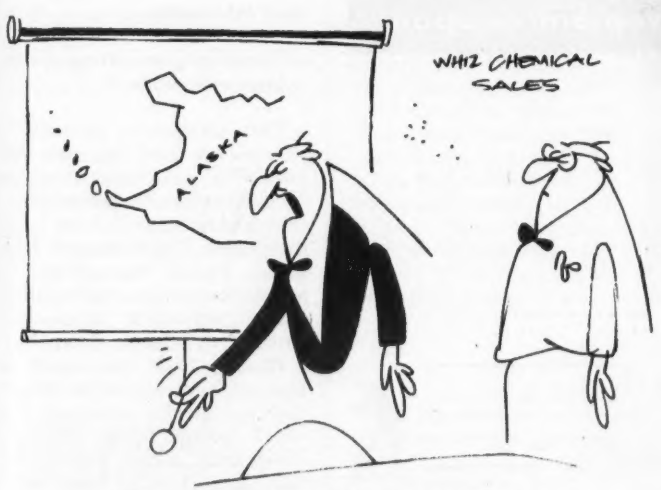
Description: Heat-reactive phenolic resin is an oil soluble, crushed phenolic, characterized by extremely fast cure. It is completely compatible with nitrile rubber and soluble in aromatic or aliphatic solvents.

Physical properties are: Specific Gravity, 1.06-1.16; Melting Point (Capillary Tube Method), 150-165°F; Color (U.S.D.A. Rosin Standards) X or lighter.

Resin is usually used in quantities up to 100 parts of resin per 100 parts of rubber. Adhesives are made by mixing together solvent, premilled rubber, and resin or, by milling resin in rubber stock before cold cutting with solvent.

(SP-12 resin is product of Schenectady Resins Div., Schenectady Varnish Co., Inc., Schenectady 1, N.Y.)

Check 3645 opposite last page.



"Of course you'll be going into it cold . . ."

Compatible plasticizer low in odor, color, and cost

Resists extraction and migration

Uses: As fast-blending polymeric plasticizer for permanent flexibility in broad range of general-purpose polyvinyl chloride applications.

Features: Compound is described as highly resistant to extraction and migration. It is said to be low in both odor and color, and highly compatible under humid conditions.

Description: Polymeric plasticizer is derived from adipic acid and has a molecular

Typical Properties

Color, Gardner	1
Pour point, 0°F.	40
Viscosity, poises at 25°C.	30
Pounds per gallon, 25°C.	9.04

weight exceeding 2000. Available in commercial quantities, compound is said to have high efficiency, electrical resistivity, and permanence under heat aging.

(Santicizer 409 is product of the Monsanto Chemical Co., St. Louis 24, Missouri.)

Check 3649 opposite last page.

Polymeric plasticizers extremely durable and adaptable

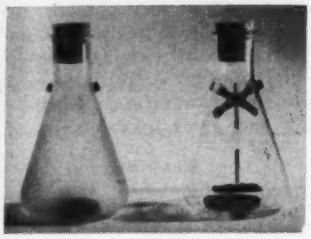
Retain original properties at high temperatures

Two polymeric plasticizers — characterized by extreme durability as primary agents or in blends with monomeric-type plasticizers — have been developed. Light-colored material lend themselves to adaptations more readily than earlier polymeric types, according to manufacturer.

Elastex 37-R plasticizer is high-molecular-weight material specifically designed for vinyl compounding. Resin compounds retain their original properties at high temperatures and are unaffected

by kerosene, oil, and soapy water.

Elastex 36-R plasticizer is medium molecular weight material developed for more general use. It shows excellent durability as well as superior handling and processing properties when compounded with nitrile elastomers. This is



Plasticizer's thermal stability resists fogging in vinyls (right). Cloudy flask (left) contains vinyl compounded from conventional plasticizer. Both were subjected to intense heat

equally true when material is combined with monomeric-type plasticizers in polyvinyl chloride. It has outstanding ability to resist extraction by aliphatic and aromatic hydrocarbons.

(Elastex 36-R and 37-R plasticizers are products of Plastics & Coal Chemicals Div., Allied Chemical Corp., 40 Rector Street, New York 6, New York.)

Check 3650 opposite last page.

Purer calcined alumina with new process

Ferric oxide content reduced to 0.04% maximum

Uses: In refractories, ceramic processes, and as abrasive in buffing, polishing.

Features: Iron contamination is reduced to maximum 0.04% content of ferric oxide.

Description: New process grinds alumina by directing streams of it at each other. Product is available as white calcined grade R2003, analyzing 99.8% through 325 mesh.

(Calcined alumina is a product of Reynolds Metals Company, Richmond 18, Va.)

Check 3651 opposite last page.

Pigment development features opacity, brightness

Has good resistance to heat, bleeding

Uses: Material is recommended as pigment for plastics, paints, and printing inks.

Features: Pigment has bright shade and is very opaque. Its heat and bleed resistance are claimed to be very good.

Description: Metallic salt azo red pigment is easy grinding and gives inks with good

Properties

Specific Gravity	1.59
Weight Per Solid Gallon (lb)	13.24
Bulking Value (gal per lb)	0.07553
Oil Absorption	38.

body and flow. It is claimed to be a good color for polystyrene, both regular and high impact, since it shows little or no coloration even for one hour at 600°F.

(Orion Red CP-1300 is product of Pigment, Color & Chemical Div., The Sherwin-Williams Co., 260 Madison Ave., New York 16, N.Y.)

Check 3654 opposite last page.

New purification process produces ethylene urea in pure form

For the first time, cyclic urea is being made available in pure, dry form. Manufacturing and purification process developed to produce ethylene urea in pure form will provide large scale tonnage production.

A colorless, odorless, neutral solid which is easily and clearly soluble in water, methanol, ethanol, etc., this purified ethylene urea is also available in the form of an aqueous 40% solution. A slightly less purified form of ethylene urea which has a 40% aqueous solution is also being produced.

(Cyclo-ethylene urea is available from Metro-Atlantic Inc., Centredale 11, Rhode Island).

Check 3655 opposite last page.

Control of bottoms from fluctuating columns and overall operations have been greatly improved at Shell Oil Co. where . . .

Continuous Initial Boiling Point Recorder Replaces Intermittent Laboratory Tests

THEODORE W. WETT
Associate Editor
with C. C. WUTH, Chief Engineer
Shell Oil Company
Wood River, Illinois

Problem: Control of fractionating columns on toluene and alkylation units at Shell Oil's Wood River refinery requires determination of initial boiling point of bottoms. Until approximately two years ago, samples had to be analyzed in the laboratory several times a day. This took at least three to four hours.

Cut point in running fractionating columns is determined by initial boiling point of bottoms stream. To meet specifications, this must be controlled within a narrow range.

Solution: In May 1956, Shell engineers installed a newly developed instrument (invented at Shell Development Company, U.S. Patent #2,594,683) on the bottoms stream from a toluene column.

Operation of Instrument

About 5 cc/min of sample constantly enters instrument through a rotameter. A constant differential-pressure flow regulator controls sampling rate. Constant heat input to sample, by means of a 50-watt cartridge heater, boils off lightest boiling material in sample.

Boiled vapors rise, contact thermocouple tip, are condensed, and return to liquid section in bottom of boiler. Cooling water is circulated through the condensing jacket at a constant rate determined by a rotameter. Only material boiling at the initial boiling point of the sample reaches the thermocouple. The thermocouple temperature is then transmitted to a recorder.

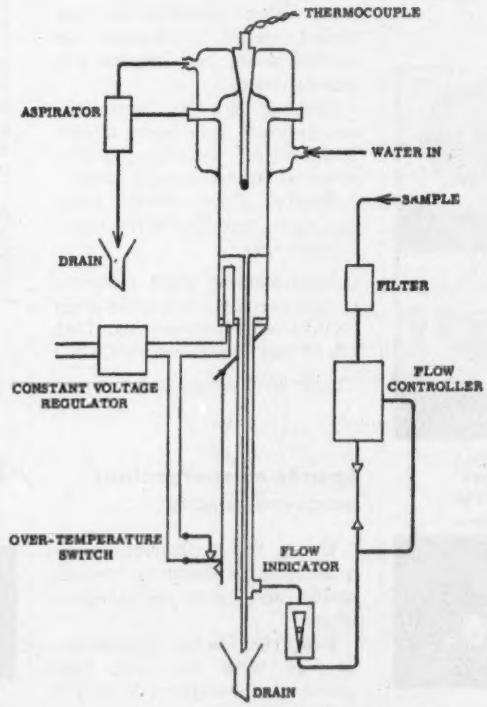
Accuracy of Instrument

Early correlations between instrument readings and laboratory data showed that the instrument was reading 4°F above initial boiling point laboratory had determined.

It was decided that this average difference could have been caused by differences in configuration of plant and laboratory test apparatus or by thermo lag of laboratory thermometers. Laboratory readings are taken while temperature is rising, whereas instrument thermocouple is near thermo equilibrium at all times. Lowering IBP recorder pen 4°F eliminated difference between instrument and laboratory readings.

Instrument now agrees with laboratory results within reproducible accuracy of the laboratory test.

Desirable accuracy and reliability of the IBP instrument led to trail of automatic IBP control. A pneumatic controller was added to the recorder. Recorder-controller output was connected pneumatically



Systematic diagram of initial boiling point transmitter

Installation of initial boiling point transmitter at Shell's Wood River refinery

to control heat input to the unit. Although a proportional band of about 600% is required in the IBP controller for stability, the system has proven reliable. It consistently holds the bottoms product IBP within ±2°F.

The IBP transmitter costs about $2250. With recorder controller and installation costs, complete IBP control system (exclusive of column temperature control system which existed) costs $3500.

Results: Operation of system has been such that about 40-50 barrels per day of product have been upgraded. Carry-over of better grade products in the bottoms has been reduced.

Time lag between column changes and necessary operating adjustments has been reduced from more than 8 hours to less than one hour. Number of routine samples sent to laboratories has been greatly reduced also. Laboratory results are now used only as a check on performance of instrument.

Maintenance

Most maintenance originally resulted from dirty cooling water. Steam condensate was not readily available. However, later installations use cooled steam condensate as cooling water and require less maintenance.

Besides water problems maintenance has been minor. Transmitter usually requires cleaning about once a week.

Shell's Wood River plant has since installed three more instruments.

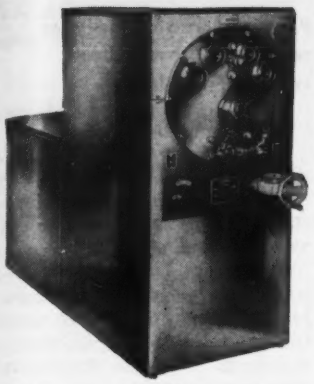
(Initial boiling point recorder is commercially available from Hallikainen Instruments, 1341 7th Street, Berkeley 10, Calif.)

Check 3657 opposite last page.

Specific microorganisms produced quickly

Uses: For culturing large quantities of bacteria, yeasts, molds, and other microorganisms.

Features: On one typical 10-hr run with the unit, 1400 grams wet weight of E. coli B cells was produced.



Aids research through production of cultures

Description: Unit consists of a double-walled, cylindrical stainless steel chamber 16″ in diameter and 30″ in length. This houses a rotating agitator with aeration fins. Controls governing sterilization, agitator speed, and other variables are located on front.

In operation, a culture of microorganisms is inoculated into prepared sterile medium of mineral salts and sugars. These organisms multiply rapidly within chamber until desired population is reached. Pump then adds liquid nutrient and withdraws bacterial suspension at an equal rate through a cooling bath and ultimately into a centrifuge where the cells are harvested.

(Biogen culturing apparatus is product of American Sterilizer Co., Erie 6, Pa.)

Check 3659 opposite last page.

"We've put in so many miracle ingredients there's no room for the product."

Process stream analyzer continuously monitors refractive index

Overcomes temperature variation effect

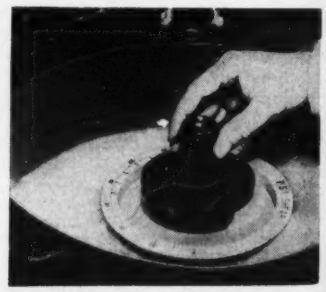
Uses: In continuous plant stream monitoring of liquid stream index of refraction.

Features: Differential refractometer overcomes a major difficulty in making continuous refractive index measurements — large variations with temperature.

Description: Key to instrument's insensitivity to effects of temperature is cell assembly. This consists of an inner cell and outer cell so arranged there is no refraction except at one surface where light emerges from inner cell into outer cell. Design is such that absolute temperature control is not necessary to give measurements of reproduceable accuracy to 6 decimals. Either cell may be used as part of process line, eliminating need for sampling lines or system. Or, a reference liquid may be in inner cell.

(Differential refractometer is available from Greenbrier Instruments, Inc., Ronceverte, West Virginia.)

Check 3662 opposite last page.



Shear test device

. . . for measuring yield stress and thus correlation parameters of stock sample. Instrument resulted from work by TAPPI Hydraulics Committee.

(Shear Tester is product of Fischer & Porter Co., 824 Jacksonville Rd., Hatboro, Pennsylvania.)

Check 3663 opposite last page.

For lab or pilot plant— small batch mixer

Uses: For blending applications in lab or pilot plant.

Features: Units are full fledged production machines with integral motor drive and controls. Tilting device allows mixer to be elevated for charging. Disk-type discharge gate effectively seals mixer during mixing cycle. Discharge is effected by operating quick acting screw on discharge gate.

Description: Small rotary batch blender is junior version of company's rotary batch mixer. Models are offered in 5-, 10-, and 15-cu ft capacity for material weighing up to 60 lb per cu ft. Blender may be obtained with quick opening doors, in drum and flush ports for cleaning. Mild or stainless steel construction is available; also internal spray attachment for introduction of liquid additives during mixing cycle.

(Small rotary batch blender is product of Munson Mill Machinery Co., Seward Ave., Utica, N.Y.)

Check 3664 opposite last page.

Sensitive switch acts with small increments of pressure

Uses: For alarm signalling and/or control involving pressure, vacuum, differential pressure, flow and liquid level.

Features: Sensitive pressure switch gives make-or-break control sensitivity of 0.005 in of water with dependability.

Description: Consisting of a contactor manometer and a relay-power-supply package, instrument can sense pressure increments as small as 0.003 oz per sq in. Switching functions are handled by the relay-power-package. Operating on 110v AC, unit uses interchangeable plug-in circuit cards which govern contact point on manometer.

(Manotac is product of Meriam Instrument Co., 10710 Madison Ave., Cleveland 2, O.)

Check 3665 opposite last page.

This automatic flow control system devised for paper mill use does NOT use Venturi tubes and flow nozzles. And — tests in two mills on four paper machines prove the system works on a production-line basis

Low-cost orifice plates meter 3% paper stock—successfully

Problem: In manufacture of newsprint and other paper products, paper stock flow to paper machine must contain a definite percentage of sulfite pulp in relation to ground wood. Usually measured amounts of ground wood and sulfite stock are mixed in a common tank. The batch is then sent to the paper machine.

Frequently, continuous stock flow proportioning is used, based on Venturi tubes and flow nozzles as primary elements. However, Venturi tubes and flow nozzles are expensive and often difficult to install and service quickly.

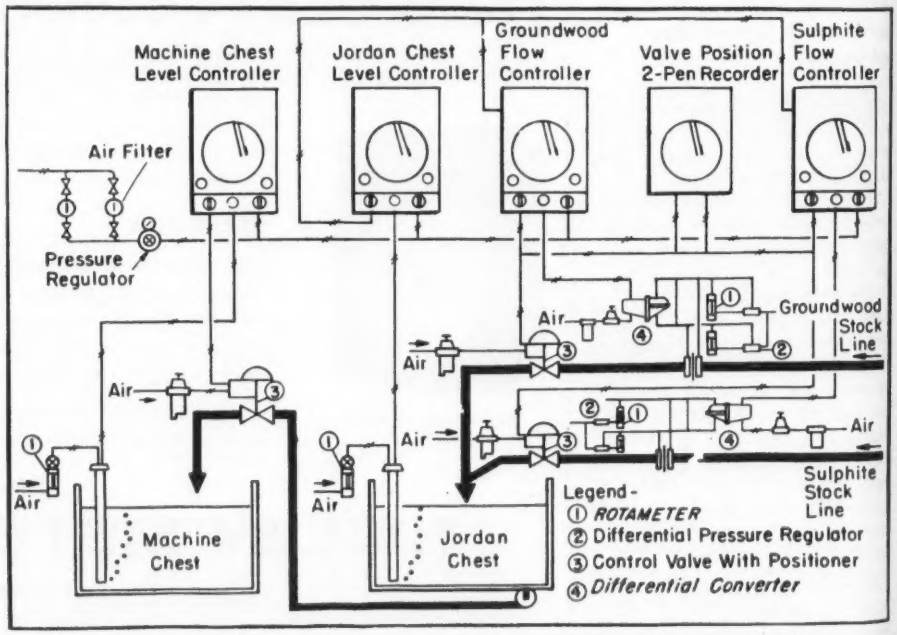
Solution: An ideal solution to the problem could be use of orifice plates as low-cost, easy to install, easy-to-maintain primary elements — but the suggestion has been rejected by many paper mills because engineers believe stock would build up behind the plates and distort metering.

However, engineering personnel of two mills on the West Coast of the United States and Canada believed orifice plates could work. The stock handled was three percent consistency with flow characteristics same as water. Four orifice plate systems were designed and installed.

Concentric Orifice Plates Used

Concentric orifice plates were used with d/D ratios of about 80 percent to prevent possible buildup of stock on upstream face of plate.

Vena contracta taps were tested on one installation, and flanged taps on another, both with excellent results. All taps were



This system for metering and ratioing paper stocks by use of orifice plates is in successful use in two West Coast paper mills

water-purged to prevent clogging. Differential pressure regulators in each water-purge system maintained a constant pressure across a rotameter and eliminated any measuring system errors from changes in water pressure.

How System Works

As shown, overall system consists of machine level controller, a Jordan chest level controller, two ratioing flow controllers in stock lines, and a two-pen valve position recorder to provide a continuous operational record of ratioing valves.

Machine chest level controller uses a bubbler system. It controls a valve in the line drawing stock from the Jordan chest.

Output air pressure from Jordan chest level control unit, also a bubbler system, positions pneumatic remote index setting units in the stock flow meters. These measure and control the actual amount of stock that will flow. Ratio between two stocks — sulfite and ground wood — is maintained by manual settings.

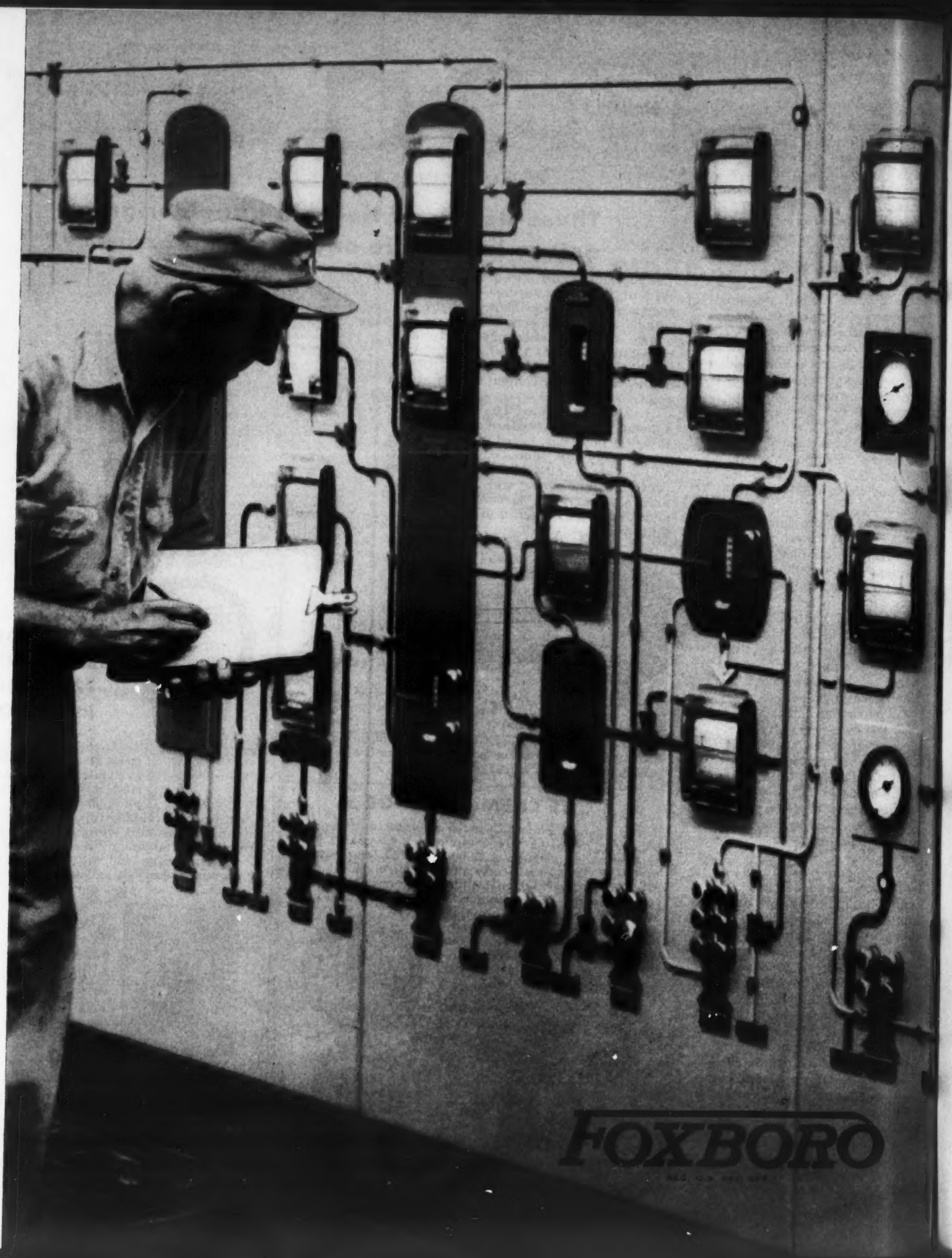
Of particular importance is that the two-pen valve position recorder shows on one chart the air pressure applied to both flow control valves. Significance is that the slightest deviation of these valves from proper performance will change the ratio of stocks mixed.

Flow-meter controllers which measure stock flows use differential pressure transmitters as measuring devices. Particular transmitters used were selected because of adjustable ranges. Since ratio system is calibrated for single set of conditions, mainly ground wood and sulfite stock consistencies and flow rates, change in rate of flow requires adjustment of ratio system.

Pinch-type control valves with positioners were originally used in stock lines. Later research showed that butterfly or other stock control valves would be more suitable.

To page 79

Check 3668 opposite last page


FOXBORO

Flow Control

From page 77

Results: Application of the orifice plate control system has allowed these two mills to continuously and automatically control ratio and flow of mixed stocks without expense and trouble of Venturi tubes or flow nozzles. Also, the work has proven conclusively that orifice plates can be used successfully to meter and ratio paper stocks on a production basis.

(Control systems are product of Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia, Pennsylvania.)

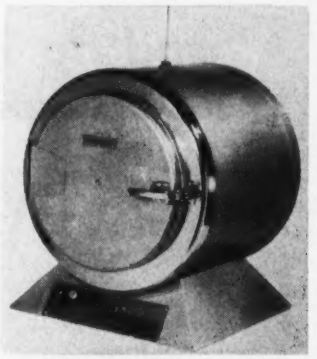
Check 3670 opposite last page.

'High style' of oven assures uniform heat

Uses: As a laboratory oven for temperatures to 250°C.

Features: "High style" of oven assures uniform heat with no cold corners.

Description: "Circle-of-heat" oven design is achieved

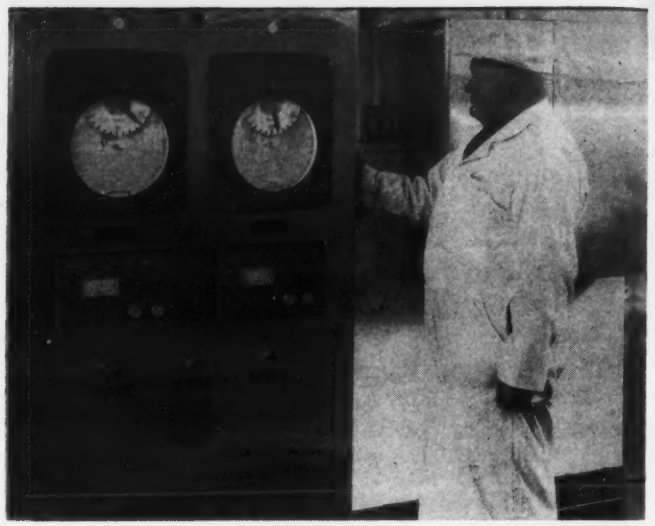


Round design of oven eliminates cold corners

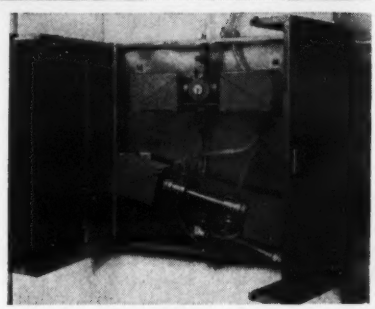
with use of inner aluminum shell. This conducts heat from heaters to working chamber. Work chamber is 13" deep by 15" in diameter. Chamber is double walled and insulated. Operation is either on 115 or 230 volts.

(Circ-O-Therm oven is product of Hevi-Duty Electric Co., Milwaukee 1, Wis.)

Check 3671 opposite last page.



These two recording turbidimeters monitor both influent and effluent of final polish filtration at brewery



Sensing elements of the two turbidimeters are shown at back of panel. Note inclined flow cell of longer tube at bottom, which prevents formation of entrained air bubbles

When quality drops, turbidity meter yells for help . . .

Monitors filtration continuously

- **Improves clarity of beer**
- **Increases filter capacity**

Problem: Clarity of beer has been evaluated in the past by subjective, manual methods involving either straight visual estimation, or comparison with prepared turbidity standards.

Besides being subject to the whims of individual judgment, most of these checking procedures have been intermittent from necessity.

Thus, even if clarity checks are made every 15 minutes, 50 to 100 barrels of hazy beer could pass through a faulty filter pad before detection.

Solution: A pioneering West Coast brewery embarked on a development program over two years ago to apply continuous turbidity measurement to the final filtration process.

First studied were two nephelometers based on the Tyndall effect. But neither of these were readily adaptable to the particular needs of the brewery.

Next tried was an instrument for measuring clarity by direct transmission of light through the beer sample.

First trials with the instrument disclosed that filtered beer having a slight objectionable haze would produce no signal at all.

By balancing circuits, choice of proper light filter, and choice of proper length of light transmission paths, this and other problems were solved.

How System Operates

Two separate clarity control operations are used — one for influent beer to the plate and frame filter; the other at the out-flow end.

In each case, suspended solids in the beer stream decrease the intensity of the light path through the sample flow cell.

Signal from the turbidimeter appears on a circular recording chart as percent transmittance, reading directly in standard Coleman Nephelo units.

Each turbidimeter is equipped with an alarm system which sounds a buzzer and flashes a red light as turbidity rises above a predetermined level.

When alarm sounds from the influent recorder, operator knows immediately that an increased filtration load is entering filter, and adjusts valve to add more filter aid.

If alarm sounds from the effluent recorder, operator also adjusts rate of filter aid flow.

If turbidity then continues to rise, he knows that he has a small break in the filter. The pumps are quickly stopped, and the faulty filter pad is removed before starting another filtration cycle.

Once a day, the brewer cleans the lines and flow cell by pumping detergent, followed by rinsing, through the by-pass system to the turbidimeters.

During this same period he standardizes each instrument on distilled water. This entire operation requires only about five minutes.

Results: Strict clarity standards can now be rigidly maintained through continuous clarity monitoring. Beer

not meeting these standards is *immediately* diverted for additional processing.

Furthermore, efficiency in the filtration room is vastly improved. Operators do not have to interrupt their own duties to judge clarity of the product—or call the lab to take samples in case of doubt.

Yet they know of any adverse changes in their operation *the instant the change occurs.*

By having objective, recorded, and continuous clarity information, plus rate of flow and total flow information, the best combination of filtration conditions can be chosen.

By utilizing the results from these efficiency studies, filter capacity can be increased.

For instance, the efficiency of different precoating practices can be compared, or various types and grades of filter aids can be evaluated under actual production conditions.

(Beckman flow turbidimeter is development of Beckman Instruments, Inc., Process Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.)

Check 3677 opposite last page.

(Foxboro recording and alarm instruments are manufactured by The Foxboro Co., Foxboro, Massachusetts.)

Check 3678 opposite last page.

Fast valve positioner matches or exceeds controller speed

For both cylinder and diaphragm actuators

Uses: As valve positioner suitable for both cylinder and diaphragm-type actuators.

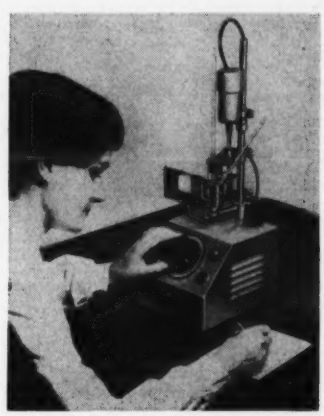
Features: Speedy valve positioner is capable of matching or exceeding speed and sensitivity of modern pneumatic controllers.

Description: Valve positioner combines force-balance design with pilot-relay valve to provide high power output and sensitivity. Feedback uses a tension spring, easily adjustable to obtain predetermined actuated travel for standard signal range. Stroke

linearity is said to be better than one percent. Completely enclosed and weatherproof, the unit responds to signal changes as low as 0.001 psi. Zero adjustment is readily accessible and can be made while in operation.

(Model J valve positioner is product of Conoflow Corp., 2100 Arch St., Philadelphia 3, Pennsylvania.)

Check 3680 opposite last page.



Accurate determinations

. . . in a minimum of time are possible with this melting point apparatus. Heating is rapid to within 5 or 10° of melting point. Further temperature increases can then be reduced to 1 or 2° per minute.

Apparatus is said to save considerable time between tests because small mass of heating fluid used plus its low specific gravity allows rapid cooling. Without compressed air, cooling takes 10 minutes from 300 to 100°C, and 8 minutes more to 60°C. With compressed air, the corresponding times are 4 minutes and 1½ minutes. Stirring of the fluid continues after heat and lights are switched off to help lower temperature rapidly for next test.

Magnifying lens in holder, easily adjusted to best position, permits convenient observation of measuring zone.

(Melting-point apparatus is available from Arthur S. LaPine and Co., 6001 South Knox Ave., Chicago 29, Ill.)

Check 3681 opposite last page.

Construct organic forms with compressible PVC models

Molecular structures can be easily built up with complete kit of 100 atoms, claimed by manufacturer to be as flexible and compressible as actual atoms. No tools are needed for assembling. Each of 11 different atoms in kit is accurately scaled from very latest measurements of van der Waals' and covalenti radii. Magnification is 165 million times actual size.

Pliability of models permits realistic demonstration of mobility of true molecules.

(Godfrey model kit is available from Will Corp., Box 1050, Rochester 3, N.Y.)

Check 3683 opposite last page.

'Trouble-spot' monitor scans 24 stations every two minutes

Indicates abnormal conditions by light

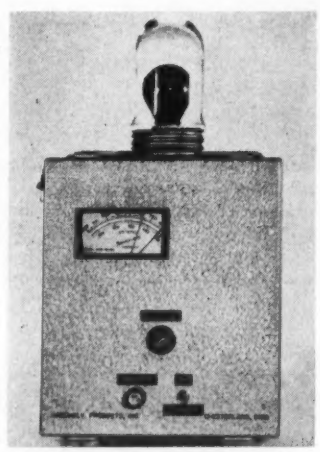
Uses: Monitoring temperatures or almost any other measurable variable from as many as 24 stations.

Features: Monitors will scan 24 stations every two minutes. Abnormal condition is indicated by light.

Description: Originally developed for monitoring temperatures −200° to 3000°F, monitor checks stations in order, 12 per minute. Signals from thermocouples or other sources are indicated continuously by moving pointer of meter-relay. Alarm sounds if indicating pointer touches either a high or low limit point. Only restriction on use is that all stations have same permissible limits. These limits may be changed at will, however. Interlock keeps control circuit broken after an alarm until reset. Circuitry is "fail-safe."

(Sequence monitor is product of Assembly Products, Inc., Chesterland, Ohio.)

Check 3684 opposite last page.



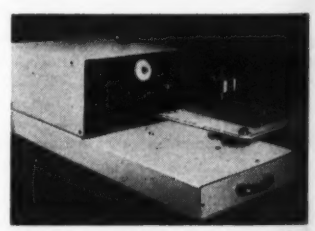
Warning light on monitor indicates trouble

Determines film data in form suitable for recording

Film tester rates factors in numerical values

Uses: Determining film properties as cohesion, adhesion, mar and abrasion resistance, impact resistance, scrub resistance, and cross-hatch brittleness test.

Features: Film tester rates factors in numerical values.



Film tester rates various film properties

Description: Film testing table is so constructed that run-of-the-mill laboratory panels, regardless of size or thickness, can be evaluated quickly. Tests are performed quickly by attachment of various specialized tools. These are attached to machine for each test. Results are said to be reproducible quickly and accurately.

(Wynn film tester is product of Forma Scientific, Inc., Box 543, Marietta, Ohio.)

Check 3685 opposite last page.

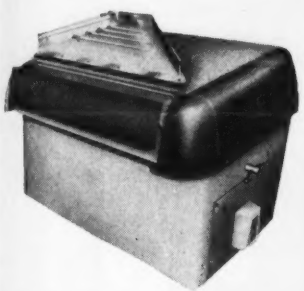
Lab flotation table adapts to research or production

Separates by fluidization

Uses: Laboratory or production classification of dry granular materials as minerals, chemicals, synthetics, foods.

Features: Air-flotation table adapts to laboratory research or production.

Description: Air-flotation table uses technique of dry separation by fluidization. Classification is made by particle size, shape, or specific gravity. Unit permits recycling of middlings to obtain a high concentration of clean end-products.



Laboratory flotation table separates dry materials

Weighing 225 lbs, unit operates quickly on ¾ hp motor, 115 volts, and requires no foundation or bolting down. Overall size is 23½" x 34" x 24".

(V-135 is product of Sutton, Steele & Steele, Inc., 1031 S. Haskell, Dallas 23, Texas.)

Check 3686 opposite last page.

Chromatograph read-out gives easy check of components

Line tracing given for each component at a glance

Uses: In pneumatic trend recording and controlling of process operations by cascade control through chromatography.

Features: Read-out system permits advantage of continuous easy checking of compo-

nents of interest. Continuous line trace of each component of interest gives at-a-glance information on concentration trends in process. Single curve for each component allows measurement of a critical component to be used as a control point.

Description: Analysis by standard chromatograph results in electrical signal output for each component of interest. Signal is transformed by transducer to pneumatic signal proportional to quantity of component. When signal into transducer reaches a maximum, transducer freezes at maxima. Simultaneously, timing device programs opening and closing of valves to pneumatic receiver and memory units.

Timer also programs restoration of transducer system to operation from frozen position after peak value is properly stored.

Pneumatic signal for each component is transmitted from pneumatic memory system to recorder, giving quantitative trace of signal peak. Memory unit maintains pressure so signal to recorder continues when electrical signal to transducer returns to 0. This gives continuous trend trace of component concentration.

(Industrial gas chromatograph using pneumatic trend recording is development of Beckman/Scientific and Process Instruments Division, 2500 Fullerton Rd., Fullerton, Calif.)

Check 3689 opposite last page.

UV Analyzer prevents loss of 44 bbl of furfural/month

Same instrument saves a somewhat lesser amount of furfural on another stream — four other UV units cut butadiene losses

GORDON WEYERMULLER, Petrochemical Editor
with **DONALD WREYFORD,** Research Physicist
Texas Butadiene & Chemical Corporation, Channelview, Texas

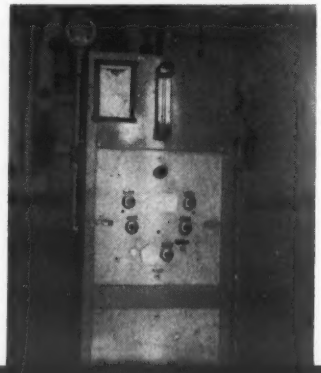
Of five ultraviolet analyzers in use at Texas Butadiene & Chemical Corporation, most unusual application is the one unit that is used for monitoring furfural strippers. Procedure which enabled UV analyzer to be used for this purpose was developed at Texas Butadiene. It is believed to be the first time that a UV instrument has been used for monitoring furfural.

Since UV analyzer was placed in service, average monthly loss of furfural has decreased 44 bbl per month from one stream. In addition, this results in a saving of sulfuric acid at the rate of 170 tons per month. Hence, the use of this analyzer on one stream accrues a total saving of about $5000 per month. A somewhat lesser amount is saved by use of same UV analyzer alternately on a second stream.

On one of the two furfural strippers, butylenes are taken overhead while on the other stripper, butadiene is taken overhead. In both cases furfural flows from the bottom of stripper. Furfural carried over with the butadiene is lost but does not consume chemicals. Furfural carried over with the butylene enters the alkylation plant and consumes sulfuric acid.

The UV analyzer monitors the furfural from 0 to 7500 ppm. Furfural going overhead normally runs 5-10 ppm. If it increases above this figure, operating conditions are changed. UV analyzer used for this application paid for itself the first two months it was used.

CP Staff Photos



Typical installation of UV analyzers at Texas Butadiene

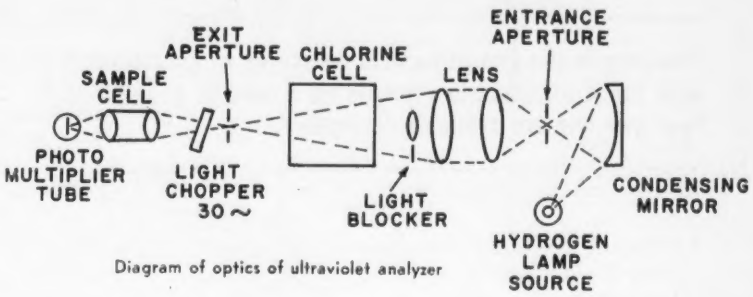


Diagram of optics of ultraviolet analyzer

Butylene Splitters

Two of the other four analyzers at plant are used on two butylene splitters to minimize butadiene losses. Butadiene is analyzed in streams containing butene 1, normal butane, butene 2, and a trace of C_5s. Only 0.2% max butadiene is permitted to come off bottom of columns.

Both analyzers are being used as recorder-controllers. A change in butadiene concentration at sample point causes a reset of flow controllers on steam to reboilers. Hence, units both monitor and control. Accuracy is within $\pm 0.05\%$ butadiene.

Deoiler, Depropanizer

Another UV analyzer alternately monitors the deoiler and depropanizer at five-minute intervals. Deoiler separates C_4, C_5, and heavier fractions. UV monitors butadiene that goes overhead in the deoiler so that operating conditions on the butylene splitters can be corrected if the butadiene content in this stream exceeds 0.3%.

Depropanizer is used to strip C_3 and lighter fractions from C_4. UV analyzer monitors butadiene in overhead. Any butadiene lost here is completely lost. It normally runs 2%. This is a small volume stream.

Furfural Absorber

Remaining UV analyzer monitors the overhead of furfural absorber for butadiene. It runs from 0 to 3.0%. If figure goes over 0.5%, overhead is recycled so that more butadiene is absorbed in furfural. UV unit tells plant when to do this.

UV Analyzers

UV analyzers used are optically double-beam instruments. Physically, there is only one light path, as shown in diagram. An optical chopper intercepts the light beam at 30 cps. During one-half cycle, chopper will transmit radiation of 200 to 280 mu to photomultiplier detector. In other half of cycle, chopper transmits radiation of 230 to 280 mu.

Latter half cycle acts as a reference beam. An increase in butadiene concentration will cause a decrease in unbalance between the two half cycles. Change in unbalance is calibrated as percent butadiene.

(UV analyzers are product of Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, Calif.)

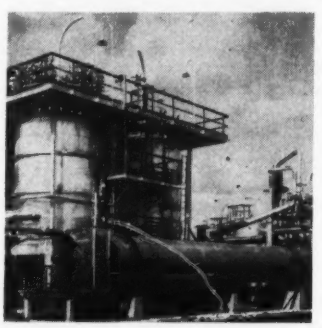
Check 3691 opposite last page

PETROCHEMICALS

All-welded construction of aluminum dryers cuts equipment cost

Using all-welded aluminum construction for two steam tube dryers at the 50 million-lb high density low pressure polyethylene plant of W. R. Grace & Co.'s Polymer Chemicals Division, Baton Rouge, La., has effected significant savings in equipment costs. Dryers have operated with a minimum of maintenance since placed in service about a year ago.

Except for tires, driving



One of aluminum dryers which helps to maintain high quality of polyethylene resin at W. R. Grace & Co. plant

gears, trunnion roll assemblies, and bed frame, aluminum was used throughout. Stainless steel pads separate dissimilar metals to prevent electrolytic erosion.

All-welded construction of shell, hoods, steam tube system, and manifolding was designed to provide greater strength and longer equipment life. Allowance was made for expansion of unit under heat due to higher coefficient of expansion of aluminum.

A tight seal is maintained inside dryers through use of double seals for all connections between shell and hoods. Floating-type rotary joint fabricated of stainless steel and aluminum parts supplies steam to dryers. Joint was designed specifically for this application.

The nature of polymer resins being handled in dryers is such that processing must be done in oxygen-free atmosphere. Aluminum was chosen for equipment because it will

not contaminate product.

(Steam tube dryers — including design of shell, hoods, steam tube system, and manifolding — were manufactured by Standard Steel Corporation, 5025 S. Boyle Ave., Los Angeles 58, Calif.)

Check 3694 opposite last page.

(Special aluminum tubes were extruded by Kaiser Aluminum & Chemical Corporation, Kaiser Building, 1924 Broadway, Oakland 12, Calif.)

Check 3695 opposite last page.

Dehydrogenation unit for synthetic rubber in West Germany

The first of three U. S. licensed foreign dehydrogenation plants has gone on stream at the Chemische Werke Huels, A.G. in Marl, West Germany. The unit is designed to produce 36,000 metric tons per year of butadiene.

The dehydrogenation process produces butadiene, the principal ingredient in general-purpose synthetic rubber, from refinery butanes and butane-butene mixtures from petroleum refineries. The process may be operated to produce butadiene for synthetic rubber, fiber, paint and textiles; butenes for alkylation to very high octane motor fuel; or adapted to produce olefiins from corresponding light hydrocarbon feedstocks.

Other, similar units, are under construction in Japan and Italy. Seven dehydrogenation units of this type are on stream in the United States.

(Dehydrogenation process unit was designed by Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.)

Check 3696 opposite last page.

Ball valves that are non-lubricated are described in detail in 16-page bulletin. Two pages of information are given on products that have been successfully handled by valves. Temperature and pressure conditions are included. "Ball Valves" — W-K-M. Div., ACF Industries, Inc., PO Box 2117, Houston, Texas.

Check 3697 opposite last page.

Lightweight honeycomb of thin-walled ceramics resists 1000°C temp

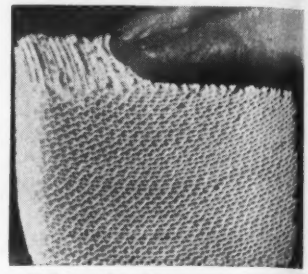
Operates at 700°C, hardly any thermal expansion

Uses: In gaseous heat exchangers, as catalyst supports, and as structural materials for use at elevated temperatures.

Features: Materials can withstand temperatures up to 1800°F with virtually no thermal expansion, and can operate continuously at 1290°F. At these temperatures, the materials are resistant to oxidation and corrosion.

Materials have extremely low coefficient of thermal expansion — 1 x 10^{-7} per degree C (from 0 to 300°C). They can withstand extreme thermal shock.

Description: Extremely thin-walled ceramics are formed into lightweight honeycomb structures. Discs 20 inches in diameter and 3¾ inches thick have been made by this process. Protective rim for disc is formed by tough coating of special material with matching expansion and equally high resistance to temperatures. This rim can be applied to all sizes to protect thin-edged walls against excessive outside stresses. It can also be used as a mounting support.



Lightweight honeycomb structures, formed of thin-walled ceramics, can be used where lightness, thermal shock resistance, and high-temperature strength are requisites

Pieces of this material have a compressive strength, parallel to the channels, of 2000 psi. Surface area of 20-hole-per-inch corrugated structure is 1500 square feet per cubic foot of material. Of total face area, 75 to 80 percent is open space. Hole sizes are approximately 0.095 inch long and 0.045 inch high. It is believed that the cellular holes can be formed into a variety of shapes with wide range of dimensions.

Material has density of about 30 pounds per cubic foot and specific heat (room temperature) of 0.20.

(Cercor structures are development of Corning Glass Works, Corning, N.Y.)

Check 3701 opposite last page.

Oxygen analyzer with new automatic calibrator is explained in four-page Bul 0704-1 — Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Check 3702 opposite last page.

Compressor features low maintenance, oil-free air

High-output rotary-screw unit requires little floor space

On the basis of operating experience during a two-year series of exhaustive field tests, manufacturer has gone into full production of space-saving, positive-displacement, rotary-screw air compressors delivering up to 19,250 cfm.

In a special 17-month trial period, two rotary-screw compressors were satisfactorily operated a combined total of 9900 hours, 8900 at full load. They were operated at delivery pressures of between 105 and 115 psi.

In addition to design compactness, compressor offers substantial maintenance savings because rotaries do not quite contact each other during high-speed spiral-like operation. Beside reducing com-

ponent wear, this design assures a flow of completely oil-free air or gas.

In operation, compressor draws air into front end of its twin-screw assembly. As large threads or lobes of parallel-mounted screws rotate into each others grooves at high speed, air is spiraled ahead into increasingly small interlobe volumes, until it is forced through discharge port at pressures ranging up to 120 psi. Twin-rotary two-stage compressor develops four complete compression cycles per revolution and operates at speeds of 3600 rpm.

According to manufacturer, compressors will be available to U.S. industry in 6700, 10,000, and 19,250 cfm models.

(Rotary-screw air compressor is product of Atlas Copco, 610 Industrial Ave., Paramus, N.J.)

Check 3706 opposite last page.

Nitric acid plants—their design and construction — are described in four-page brochure which includes flow diagram of typical application of Du Pont high-pressure ammonia oxidation process. "Nitric Acid" — Girdler Construction Div., Chemetron Corporation, Louisville 1, Ky.

Check 3707 opposite last page.

Rotary positive blowers are detailed and pictured in eight-page bulletin. Gas pumps and vacuum pumps are also covered. Bul S-59G — Sutorbilt Corp., Subs. of Fuller Co., Compton, Calif.

Check 3708 opposite last page.

Single unit protects gages, personnel

Instant shutoff for actuation from 5-2400 psi

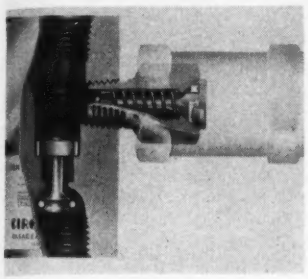
Uses: For protecting gages from over-pressure.

Features: System provides, in a single unit, all characteristics necessary for protection of gages and operating personnel. Precise operation is insured even at very low settings due to use of contact rather than sliding seals.

Description: Gage protector has instant, precise shutoff for

actuation from 5-2400 psi. Gage protector valves overcome O-ring breakaway friction problem, characteristic of piston-type units.

Protectors automatically shut off instantly to protect operating personnel in event



Contact seals of gage protector valves insure precise operation even at very low settings

of bourdon tube rupture. Automatic gage cut-out and cut-in is provided. Snubbing action in gas systems where surge waves or shock waves are encountered closes valve unit momentarily to reduce shock on gage elements.

Protection system permits cascading gage to provide accurate pressure readings over wide range of pressures. Protector valves automatically cut out lower pressure gages as system pressure rises and cut them in as system pressure falls.

(The 1100 Series Gauge Protector valves are product of Circle Seal Products Company, Inc., 2181 East Foothill Blvd., Pasadena, Calif.)

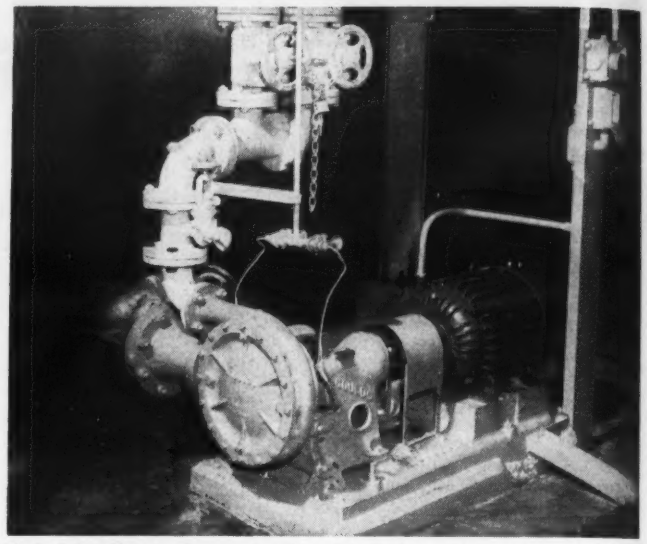
Check 3709 opposite last page.

Low pressure compressors of heavy-duty type are described in eight-page bulletin which also includes detailed sectional drawing. There also is complete run-down, with illustrations, on all vital parts and features, Bul A-95 — Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.

Check 3710 opposite last page.

Liquid level gages designed for remote reading are covered in detail in eight-page catalog. Cat 338 — Jerguson Gage & Valve Co., Adams St., Burlington, Mass.

Check 3711 opposite last page.



Typical installation of pump used to handle latex. This unit transfers latex from storage tanks to tank cars for bulk shipment

Constructed so they can easily be cleaned without removing from line when they become clogged with rubber, centrifugal units —

Pump synthetic rubber latex with minimum maintenance

GORDON WEYERMULLER, Petrochemical Editor
with **ROY E. LEEDY,** Mgr. Engineering & Maintenance
Synthetic Latex Plant
Goodyear Tire & Rubber Company, Akron, Ohio

Problem: Diaphragm and other conventional centrifugal pumps used for handling synthetic rubber latex at Goodyear Synthetic Latex Plant at Akron had high maintenance and cleaning costs. Periodically, a considerable quantity of rubber would become lodged in pump. Downtime and excessive maintenance occurred when a pump was removed from line for cleaning.

Solution: About four years ago plant started using centrifugal chemical pumps which are constructed in such a way that they are particularly suitable for handling synthetic rubber latex. Both suction and discharge connections are located in casing. Removal of casing cover permits interior of pump to be inspected or cleaned without disturbing piping connections. Similarly, impeller may be removed or replaced without disturbing piping.

Stuffing box is on suction side of impeller. This limits pressure on stuffing box to suction head or pressure under which pump operates. This insures long packing life and freedom from excessive leakage.

Should wear eventually occur between impeller vanes and casing, provision is made

for external adjustment of clearance between these two parts.

Entire fluid end of pump can be 316, Gould-a-loy 20 (same as ACI CN 7M CU), all iron, all bronze or bronze fitted, or all iron with stainless trim.

Results: Pumps have been found highly satisfactory for handling synthetic rubber latex at the Goodyear plant. A number are already in use for this type of service and more will probably be installed.

Although exact figures are not available, substantial savings have been made since very little maintenance is required on pumps. Whenever a pump becomes clogged with rubber, it can be opened and cleaned without removing it from line.

(Fig 3715 centrifugal chemical pumps are product of Goulds Pumps, Inc., Seneca Falls, New York.)

Check 3714 opposite last page.

Protective air stream delivers touchy catalyst

Maintenance no problem

Operating continuously since April 1957, rotary positive pressure blower has provided protective air stream for sensitive catalyst

A Phillips-type polymerization process at W. R. Grace & Co.'s Polymer Chemicals Division plant at Baton Rouge, La., produces a high-density, low-pressure polyolefin, utilizing a gas catalyst. This catalyst must be delivered to the process pressurized in a protective air stream to prevent an explosive hazard.

The pressurizing air stream is developed in a rotary positive pressure blower. Several

important factors govern activation of a catalyst. Positive constant pressure must be maintained in the air stream, and contamination of the catalyst must be avoided. This is accomplished by the use of Teflon seals in the blower. The rotary positive pressure blower has been in continuous operation in open air since April 1957 with no maintenance other than routine care.

Air supply for catalyst activation is 170 cfm from blower which runs at 670 rpm, and is driven by a V-belt connected to a 10 hp motor. Capacity has not diminished since plant start-up.

("California" series rotary positive pressure blower is product of Sutorbilt Corp., Compton, Calif.)

Check 3717 opposite last page.

Automatic end point recorder which determines and records the maximum temperature attained during the distillation tests of a hydrocarbon mixture is described in four-page publication. Operating range is 225 to 675°F. Bul 703 — Precision Scientific Development Co., Div. of Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

Check 3718 opposite last page.

Vary capacity range of axial compressor in operation

High inherent efficiencies, part-load pressure rise

Uses: For petroleum-chemical processes, coke-oven gas exhausters and boosters, and other industrial applications.

Features: Through use of adjustable inlet guide vanes and full or partial stator blade control, capacity range of compressor can be varied while machine is in operation and still retain high inherent efficiencies and part-load pressure rise.

Description: Low-cost constant speed motors can be used with axial compressor because of instantaneous compressor range adjustment design. Savings in operating costs

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THAT'S INTERESTING

Plastic lifeboats

U.S. Coast Guard has approved the use of plastic lifeboats on all ships flying the American flag. Approval was granted lifeboat manufacturer on design resulting from two years of research and development work. Glass-fiber reinforced boat will not support combustion. It is also impervious to rot, and corrosion.

Translations directory

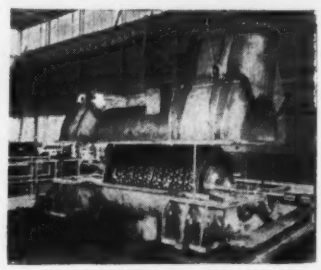
The Dept. of Commerce is now publishing a semi-monthly directory intended to serve as a central source of information on Russian and other technical translations available to science and industry. It will be published in cooperation with the Special Libraries Association. SLA's *Translation Monthly* will be incorporated in the new periodical.

For more information on product at right, specify 3720 see information request blank opposite last page.

PETROCHEMICALS

From page 96

are achieved through elimination of inefficient blow-off, bleed-in, recirculation, or any combination of these methods normally required when operating standard compressors with constant-speed drives.



Increased flexibility and broadened capacity range are features of axial compressor

Control of range extension devices can be accomplished in several ways. Simple method consists of handwheel mounted on compressor. Another method utilizes hydraulic cylinders or electric motor actuators. Actuators can be used either with remote manual control consisting of subpanel with selector knob, or their operation can be tied directly into process.

(Axial compressor is product of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Check 3722 opposite last page.

Gas turbines, their design features, types of fuels, plus applications are detailed in 16-page Bul 167 — Clark Bros. Co., one of the Dresser Industries, 617 Lincoln Ave., Olean, N. Y.

Check 3723 opposite last page.

Precision pressure gages for severe or dangerous services are described and illustrated in 36-page booklet. Cat DH-65 — Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Connecticut.

Check 3724 opposite last page.

Stainless steel heat exchangers, in 19 sizes and with different designs, are covered in four-page bulletin. Bul 301.6K1 — Ross Heat Exchanger Div., American-Standard, Buffalo 5, N. Y.

Check 3725 opposite last page.

Prepared by U. S. Industrial Chemicals Co.

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Market for Rigid Urethane Foams Growing Rapidly

While rigid materials accounted for less than 10% of the total polyurethane foam market in 1957, 1958 figures are expected to show an increase to more than 20% of the total market. The Society of the Plastics Industry feels that by the end of 1959, 30-40% of the demand will be for the rigid foams.

The material is proving ideal for industrial and home insulation. Packaging applications are expanding. Makers of marine equipment are using the rigid foams for buoyancy. Military applications include radiation shields and heliohuts. More and more, structural panels and laminates are being made with rigid urethane foams.

Users can buy fabricated foam or they can foam the material themselves in place, by employing either molding or spraying techniques. Special equipment has been developed for spraying urethane polymer onto overhead, vertical or irregular surfaces. It foams and sets in place rapidly to give a rigid coat which will not slip, sag or fall away.

Rigid urethane polymers are formed by mixing two chemical components—polyisocyanates and polyesters. Carbon dioxide gas is given off during the reaction and it serves as a blowing agent which causes the polymer to foam in place. An intermediate that can be used to produce the polyester component is ISOSEBACIC® acid, a mixture of C-10 dibasic acids. ISOSEBACIC acid will be available soon in commercial quantities from a new U.S.I. plant at Tuscola, Illinois.

"Stabilized" Polyethylene Fabrics Now Being Made Via New Finishing Process

A patented technique for finishing polyethylene fabrics is now being employed to improve shrink resistance, strength, appearance and other physical characteristics. According to the patent, conventional finishing methods for polyethylene fabrics—calendering or hot fluid treatment of the greige goods to preshrink them—result in loss of yardage, strength and optimum appearance.

The patented process involves the pretreatment of oriented polyethylene filaments before conversion to give them a residual shrinkage of 8-20% (tested at 75°C for 20 minutes). The filaments are then converted to greige goods, in which they have a wavy form.

The greige goods are subsequently held along both the length and width to prevent retraction and are heated at a strictly controlled temperature for a limited time. So held and treated, the filaments in the fabric shrink to the extent of their residual shrinkage and straighten out, without reducing the area of the fabric.

By comparison with fabrics finished by conventional methods, these materials are said to have better appearance, strength and aging properties. The process is claimed to provide economies in operation — to save yardage and to reduce the number of finishing steps required.

Vitamin C Indicated for Virus & Other Infections

Several medical investigators have found that continuous massive doses of ascorbic acid (Vitamin C) are effective in treating virus diseases such as polyiomyelitis, measles and virus pneumonia; bacterial infections such as tuberculosis and scarlet fever; and cases of poisoning such as snake bite and lead poisoning. The range of antibiotic and antitoxic action is said to be unusually broad, and, in addition, there is claimed to be *complete freedom from allergic or toxic reaction.*

Intravenous or intramuscular injection is the preferred method of treatment. When so administered, ascorbic acid is said to compare favorably with sulfa drugs and mycelial antibiotics. Effectiveness of the therapy is reported to be dependent upon the potent oxidation-reduction action of ascorbic acid, which rapidly neutralizes viral or bacterial toxins.

Ascorbic acid occurs naturally in citrus and other fruits, as well as green leafy vegetables. One method of producing it synthetically is by using L-sorbose as the starting compound and employing *sodium methoxide* in the final (enolization) step of the synthesis.

Index of Chemical Patents Now Being Prepared

Every patent relating to chemistry which has been issued by the U. S. Patent Office since 1950 is being collected and indexed for reference purposes by a Washington information service. The collection is being kept current and is being made available on a subscription basis to chemical companies, libraries, educational institutions and other interested organizations.

At the moment, indices for 1955, 1956, 1957 and the first 10 months of 1958 are available. They cover 30,000 patents. A trained staff of chemists and biochemists is now working on the indices for 1950-1954, which will add another 40,000 patents. It is estimated that when this work is completed, in about two and one-half years, more than 100,000 patents will have been collected and indexed.

It is claimed that the indexing method used analyzes, edits, classifies and cross-indexes U. S. chemical patents into the fastest and most accessible reference system ever devised.

Gov't. Authorizes Substitutions In SDA 40 Alcohol Formulation

Shortage of Brucine Denaturant Made Modifications Necessary.

SDA 40, which the U. S. Government authorizes for use in toilet goods, external pharmaceuticals, biocides, detergents, etc., has been formulated until now with ⅛ gallon of *tert.*-butyl alcohol plus 3 ounces of brucine alkaloid or 3 ounces of brucine sulfate per 100 gallons of ethyl alcohol. To relieve difficulties of denaturers and users of this formulation due to a critical shortage of brucine, the Internal Revenue Alcohol and Tobacco Tax Division (A. & T. T. D.) has authorized the formulation of SDA 40 with ⅛ gallon of *tert.*-butyl alcohol plus either 1½ ounces of brucine alkaloid, or 1½ ounces of brucine sulfate, or 1½ ounces of quassin per 100 gallons of ethyl alcohol.

How the Substitutions Came About

When the brucine shortage first became acute, an inability to meet customer requirements for SDA 40 threatened to upset the entire industry. Recognizing the situation, the A. & T. T. D. authorized quassin as an alternate denaturant.

While brucine is one of the bitterest materials known, quassin had been tested and found sufficiently bitter and acceptable from other standpoints to serve as an alternate denaturant. Quassin had been used as a denaturant in Canada for 25 years, and this experience dispelled concern about possible adverse effects arising from its use.

Samples of SDA 40 denatured with quassin were offered to the trade, and users were urged to make up their products with this alternate, to assure compatibility with their formulas. After testing, many customers advised that they would accept SDA 40 alcohol with this denaturant.

However, realizing that limitations on the supply of quassin made it an incomplete answer to the shortage, the A. & T. T. D. took quick action to extend existing supplies of brucine by authorizing denaturation with reduced quantities of brucine alkaloid and

MORE

SDA 40 AUTHORIZED USES
(Under Permit)

- Hair and Scalp Preparations
- Bay Rum
- Lotions and Creams (Hand, Face, Body)
- Deodorants (Body)
- Perfumes and Perfume Tinctures
- Toilet Water and Colognes
- Shampoos
- Soaps and Bath Preparations
- External Pharmaceuticals (not U.S.P. or N.F.)
- Disinfectants, Insecticides, Fungicides and Other Biocides
- Cleaning Solutions (including Household Detergents)
- Theater Sprays, Incense and Room Deodorants
- Miscellaneous Dye Solutions
- Miscellaneous Solutions

★ U.S.I. CHEMICAL NEWS ★

CONTINUED *Alcohol*

brucine sulfate. Consequently, there are now three new SDA 40 formulations approved by the Alcohol and Tobacco Tax Division. U.S.I. designations are shown in the box below.

U.S.I. Designations for New SDA 40 Formulas

SD-40-1M .....1½ oz. brucine alkaloid
SD-40-2M .....1½ oz. brucine sulfate
SD-40-3 .....1½ oz. quassin

U.S.I. Studying Alternate Denaturants

Because brucine and quassin derive from natural imported products, there is always the possibility that the supply of these denaturants might be inadequate at some future date. U.S.I.'s research laboratories are therefore continuing studies to develop suitable additional alternates.

Ideally, alternate materials suitable as denaturants should be synthetic and domestically produced. Once found and tested in end-use formulations, such stand-by alternates—pending approval by the government—would assure denatured alcohol consumers of an uninterrupted flow of raw material at all times.

Methionine-Hormone Formulation Effective For Treating Acne

Clinical studies have revealed that a formulation of DL-acetyl methionine, estrogenic hormone, colloidal sulfur and resorcin applied to the skin is effective for treating acne conditions.

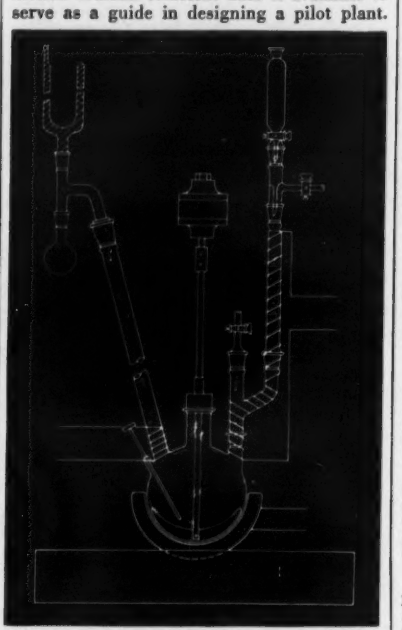
The medical research workers who conducted these studies found that methionine—the sulfur-bearing amino acid—and the estrogenic hormone act synergistically to reduce the excessive secretion of fatty materials from the sebaceous glands—a characteristic condition in acne cases. Consequently, the formulation dries and heals the acne lesions rapidly.

For optimum results, the treatment was supplemented with dietary and hygienic routines, and small oral doses of thyroid extract and estrogenic hormone.

Pure Sodium Alkoxides Can Be Made by Dry-Way Process

A new technical bulletin just released by U.S.I. describes a valuable but little-known technique for preparing sodium alkoxides from metallic sodium and alcohol vapors. This low-cost, dry-way process yields powders which are high-analysis alkoxide, in contrast to the 16-18% alkoxide solutions produced by the usual method of introducing sodium into liquid alcohols. It provides a way for pharmaceutical and other manufacturers who make their own alkoxides to get a high-purity material.

Products are almost identical in analysis to commercially available alkoxides. Although the bulletin describes the laboratory technique of passing vaporized alcohols over molten sodium, sufficient data is available to serve as a guide in designing a pilot plant.



Laboratory apparatus for dry-way preparation of sodium alkoxides.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

L-Methionine, labeled with both carbon-14 and deuterium (methyl-$C^{14}D_3$), can now be obtained for research purposes. This amino acid is reported useful in studying the mechanism of ergosterol. **No. 1430**

Cosmetic technology is discussed in new, 1450-page book now being sold. In 53 chapters, 61 experts cover over 3 dozen types of products. Includes technology, historic and legal aspects, physiology, testing, manufacture. **No. 1431**

Slide rule for chemists has special scales for solving pressure, temperature, solution concentration problems on one face, standard scales on other face. Gives atomic wts. of 52 elements, molecular wts. of 18 atomic groups. **No. 1432**

Chloromethoxypropyl mercuric acetate solutions now available in commercial quantity. Fungicidal and bactericidal activity claimed superior to phenyl mercuric compounds, due partly to presence of labile chlorine atom. **No. 1433**

Uses of stainless steel in CPI discussed in newly revised, 40-page free booklet. Sections on fields of plastics, detergents, nuclear power, others. Includes corrosion resistance table and table comparing stainless grades. **No. 1434**

Full line of polyesters for producing rigid or flexible urethane foams can now be obtained commercially. For rigid products, combinations of prepolymer and polyester are offered for foaming in place by mixing or spraying. **No. 1435**

Long-path infrared system recently developed is said to detect evaporation from one drop of a predetermined chemical in an average room. System senses the chemical by its IR spectrum, is not usually sensitive to other materials. **No. 1436**

Polyethylene work gloves now on market are claimed to provide protection without loss of fingertip sensitivity. Are lightweight, waterproof, resistant to most chemicals. Said to be suitable for use with radioactive materials. **No. 1437**

Comprehensive file of trademarks used by CPI here and abroad is now available for reference at a charge. Includes registered, unregistered, common, scientific, technological names. Composition, uses, producer given in many cases. **No. 1438**

New analytical-grade ion-exchange resins based on cellulose are claimed suitable for chromatographic fractionations of high-molecular-weight materials beyond range of conventional resins. Are extremely porous and hydrophilic. **No. 1439**

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Aromatics

From page 25

million gal total, about 220 million gal will be from coking operations and 230 million gal from petroleum. To this must be added the nearly 50 million gal imported annually, which brings potential supply up to approximately 500 million gal.

Today's requirements are about 335 million gal, so it doesn't take a very searching look into the crystal ball to determine that it will be quite a few years yet before we can hope to "occupy" our domestic benzene capacity, even if imports dry up.

Higher Purities Due

Another factor is that steel companies and others making benzene from coke have installed facilities to make benzene in a higher purity to compete better with petrochemical benzene.

More coal tar benzene is now being upgraded in purity by a process licensed by Esso Research and Engineering Company.

Importing aromatic hydrocarbons at a time when there is considerable over-capacity right at home has stirred an ever-mounting controversy in the chemical processing industry. Mr. Tracy is outspoken in his views. Do you agree or disagree with him? The editors of CHEMICAL PROCESSING welcome your opinions on this subject and invite your comments. Just write to "Aromatics Forum," CHEMICAL PROCESSING, 111 East Delaware Pl., Chicago 11, Ill.

The Soviets can be blamed for the queasy naphthalene market situation. If it were not for imports — principally from behind the Iron Curtain — requirements of this product would be more nearly in balance with supply.

Rising prices of materials and transportation, higher

For more information on product at left, specify 3727 . . . see information request blank opposite last page.

Aromatics

From preceding page

wages, and other increasing costs emphasize the seriousness of competition from cut-rate imports. So there seems little doubt that we will have to live with rather meager realizations on aromatics for some time. A return to happier days appears predicated upon more efficient operating units and in a better balance between market requirements and producing capacity. It would be nice to say that this better balance will come with a lessening of competition from foreign benzene and naphthalene, but such a trend is not apparent.

Educating Engineers

From page 28

whereby universities or colleges can be kept busy with applied research necessary for teachers to do the best possible job of educating students, thereby obtaining the best results for industry without outside influences. Otherwise, teachers must be given sufficient time to engage in pure research.

But it would not be proper that industry should foot the bill for all of this. It is important that industry and institutions of higher learning seek new patterns of liaison between fundamental research activities of a school and the more directed, committed research of industry so that cross-fertilization may be encouraged while recognizing and protecting the specialized functions of each. In all cases, industry must recognize the responsibility for educating the engineer to full professional status.

Industry must also support the tendency that only graduates of universities or colleges with a master's degree or a Ph. D. are to be considered engineers, and that there cannot be another place to educate men of technical bent to become so-called engineers.

We do not wish to take sides in this dispute, but we con-

tend: We must find a solution or we will never raise industry to the level considered best for our country. Only the sincere effort of everyone working in the same direction will again bring the U. S. into the first line of scientific endeavor.

One of the first things to be decided is what constitutes pure or basic research and which is applied research. Their limits are not clearly defined, making a decision difficult.

One can be certain that universities should be engaged in activities necessary to meet functions of institutions of higher learning and, doing this, it is obvious to a great extent that sponsored research activities should not only support individual faculty members, but it should give them possibilities to teach the newest in technical advances.

Radioactive materials disposal methods safe, permanent

Geneva peace atoms parley told about different ways

How three billion gallons of radioactive liquids have been safely and permanently disposed of at American atomic plants was described at the second international Atoms for Peace conference held in Geneva, Switzerland.

Delegates were told liquid waste has been dumped into the ground without danger of radioactive materials getting into public water supplies by using various disposal methods which range from digging reverse wells to seepage pits.

Most wastes emanate from chemical plants where irradiated atomic fuel is processed, and its disposal depends upon various types of soil.

As an example, the Hanford, Wash., atomic plant is in a high desert basin with up to

300 feet of dry soil between surface and natural underground waters.

Reverse Wells

Reverse wells, one of the first devices tried—involved pouring waste into deep holes, but method was unsatisfactory because wells quickly plugged up. Also, liquid passed through much of the deep layer of dry earth, making less likely removal of offending elements.

Cribs and caverns have largely replaced reverse wells, but the latter still are used for small amounts of laboratory wastes. Cribs and caverns are large holes scooped out of desert floor, filled loosely with rock or gravel, and covered with a protective layer of sand. Waste piped into them seeps slowly out of bottom and down through soil.

Wells Drilled Nearby

Wells are drilled nearby so that ground water samples can be removed for testing. Radiation detection instruments are lowered to check on movement of wastes through soil. Crib is abandoned when offending elements in waste approach ground water. Only part of radioactive material reaches water, and its movement is so slow that practically all radioactivity dies away by natural decay before waste material gets to plant boundary.

A system of three artificial basins has been set up at Savannah River plant in South Carolina for each of two separations plants. Wastes sent to first basin flow slowly to second, then on to third. Solids settle out in first two basins, while liquid seeps out at bottom of third. By the time seepage reaches ground water, natural radioactive decay and chemical removal by soil has rendered it harmless.

Seepage pits are in use at Oak Ridge, Tenn., where laboratory relies on natural decay and extreme dilution in natural waters to bring about safe concentrations of radioactive wastes.

(Information based on paper presented at Geneva by Dr. D. W. Pearce, General Electric Company's Hanford Works, Richland, Wash.)

Availability of tough plastic membranes brightens outlook for an old but heretofore only limitedly used process. Boasting long service life with minimum maintenance, units pave the way for large-scale use in . . .

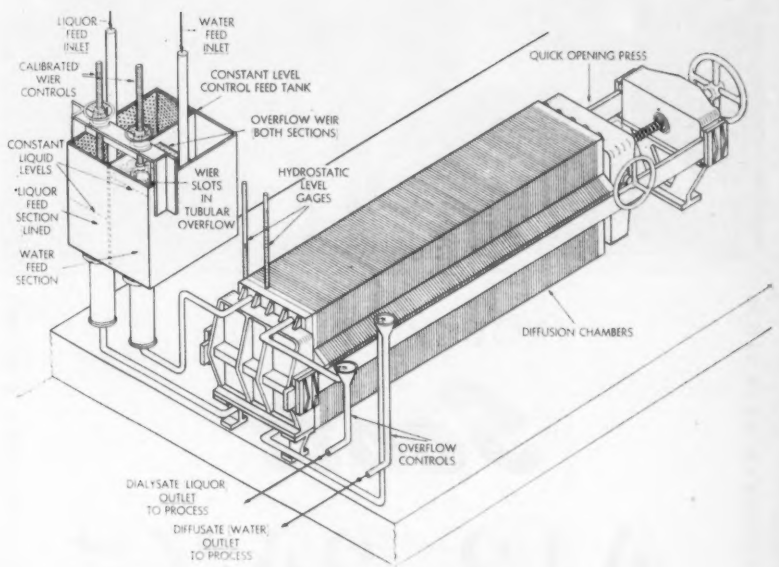
Separating Acids and Chemicals by DIALYSIS

DEVELOPMENT of acid-resistant vinyl membranes has opened the door to a wide range of applications for dialysis in chemical processing operations. Although discovered over 100 years ago, the process has found only limited use to date — its one main commercial application being recovery of caustic from alkaline steep liquors in the viscose rayon industry.

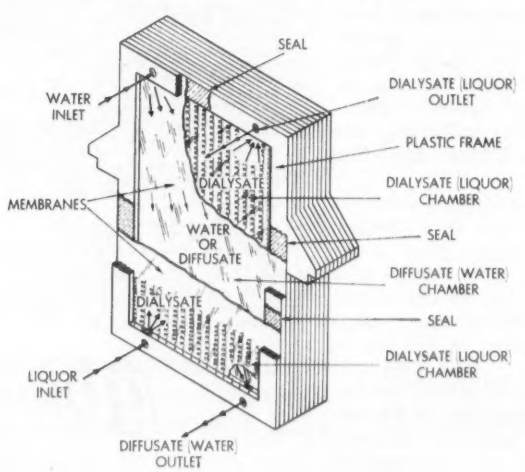
Major drawback, of course, has been inability of the conventional parchment-type membranes to withstand acids. The plastic units have whipped this problem. The tough vinyl membranes withstand temperatures up to 120°F, need little if any maintenance, and are said to last at least two years.

Examples of acid recovery applications for the dialysis equipment include sulfuric acid in ore processing; hydrochloric acid in ore reduction; hydrofluoric acid in pickling and glass etching; nitric acid in metallurgy and photo-engraving; and chromic acid in process engraving, anodizing, and other operations. In all of these, purification of the acid not only makes it available for reuse, but it makes the products in the main liquor stream more readily recoverable.

Process can also be used to remove inorganic acids and salts from such materials as gelatin, glue, latex, sugar, and protein, and for other chemical separations.



Dialysis system consists of a feed tank and a plate-and-frame type unit forming the diffusion chambers



Membranes have 0.032" effective film thickness, are mounted on ¼"-thick plastic frames

Equipment Design

Dialysis is a diffusion process whereby specific molecules in a liquor can be separated by being passed through a semi-permeable membrane. Equipment consists essentially of a feed system and a structure to hold the membranes. The dialysis unit has plate-and-frame filter press design. Alternate liquor and water cells are formed by the frames and membranes. Entire assembly is held firmly together by a hand-operated screw.

Frames on which membranes are mounted are made of ¼"-thick plastic. Membranes have 0.032" effective film thickness, with actual thickness of 0.0045". Spiral separators between membranes maintain effective operating area in each cell.

All supporting members and pipe are made of metal — steel, stainless, or cast iron. Feed tank is located about 10 to 12' off floor to provide adequate head for gravity flow through system.

Size of dialysis unit depends on number of membranes used. Equipment stands about 4' high. Large units measure between 10 and 12' long. Medium membrane size is 20 by 30". Entire system, including feed tank and

flow regulators, comes as packaged unit. No power is needed except for pumping liquids into feed tank.

Operation

In operation, controlled quantities of water (ordinary tap water is okay) and liquor from feed tank enter dialysis portion of system, flowing along conduits formed by joined ports of the membranes and frames. Liquor travels along bottom and water through top.

Liquor entering each cell passes upward and diagonally across membrane, leaving at top. Water in its cells takes opposite course, passing downward, across, and out the bottom.

This cross and counter flow assures greatest separation by providing longest possible holdup time and lowest acid concentration difference at every point across the membrane where diffusion takes place. Liquids flow out of unit continuously and are collected in separate receiving tanks.

Capacities and Results

Depending upon size of equipment, feed rates of 50 to 500 gph or more are possible. Acid recovery of up to 90% can be achieved. On an hourly basis, this can result in up to ½ ton of recovered product.

As a general rule, the lower the operating rate, the higher the recovery because more holdup time is allowed. Lower rates are used when a less-than-pure solution is acceptable, since increasing holdup boosts possibility of impurities passing through membrane. Purest solutions are achieved at highest operating rates.

System operates on continuous basis. Once it is started, very little supervision is required. Part-time service of a single operator, to check that feed and circulating pumps are functioning, is all that is necessary.

Downtime, a serious limitation in the past due to deterioration and need for replace-

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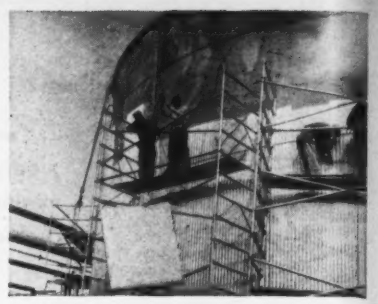

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Thermal and acoustical glass fiber insulations . . . molded glass fiber pipe insulation
Plain and grooved end couplings and fittings

For more information on product at left, specify 3735 see information request blank opposite last page.

Hi-Sep Dialysis

From page 104

ment of the parchmentized paper membranes, is minimum. The vinyl membranes have a high tensile strength, are sturdy, and stay on line for long periods of time.

Units are said to be able to do two or three times the work of conventional processing equipment, at a fraction of the capital investment. Costs, depending upon size, range from $3000 to $20,000.

There are some limitations to the equipment. A basic one is need for sufficient concentration gradient in the liquor to supply driving force necessary for diffusion. Removal of low-concentration materials must also be carefully studied. Temperatures higher than 120°F in liquors may be harmful to the plastic membranes. Liquors should be relatively clear, with minimum sludge content.

(Further information about Hi-Sep dialysis systems may be obtained from Graver Water Conditioning Co., Division of Union Tank Car Company, 216 West 14th St., New York 11, New York.)

Check 3737 opposite last page.

Mud reclamation barge cuts drilling fluid costs at Gulf Oil

Pump on barge can move walnut shells at 450 gpm

Expensive oil well drilling fluids that used to be discarded at completion of drilling an oil well, are being recovered by means of an efficient mud reclamation barge at Timbalier Bay oil fields, Lafourche Parish, Louisiana. Use of the barge has greatly cut overall field drilling mud costs. Fluids cost from $5 to $17 per bbl and range in density from 11.0 to 17.5 lb per gallon.

Because main portion of oil field lies in water varying in depth from sea level to 8 ft, drilling operations are conducted from barges. Rigs used to become so heavily laden with surplus volumes of drill-

ing fluid at end of operation, that they would no longer float. Fluid would have to be transported to a regulated disposal area before drilling barge could move to next location.

Developed by Gulf Oil Corporation, the mud reclamation barge consists of a 110 x 30 x 7-ft cargo barge equipped with the following major pieces of equipment: A 750- and 250-bbl capacity storage tank, three 7½-hp stirrers, a 500-gpm screw-type rotary pump, hydraulically-powered decanting-type centrifuge, 40-kw generator set, 2-hp light plant, and a 2-hp centrifugal pump for water.

Pump Can Handle Walnut Shells

One of the most important units on the barge is a big single-screw type pump.* Powered by a 50-hp diesel engine through a 3:1 reduction gear, unit can handle large sized granular particles, such as ground walnut shells, at rate of 450 gpm at 600 rpm and 150 psi pressure.

In addition to serving as a mud transfer pump, unit is used to seal off porous or fractured formations in wells. These are often encountered during drilling operations and must be plugged to prevent loss of drilling fluid to the formations. In such cases, pump moves concentrated slug of walnut shell and mud slurry down drill pipe to seal off zones of loss circulation.

Purpose of centrifuge is to separate barites from low-density drilled formation solids in liquid mud slurries. The barites are recovered for reuse while the low density formation solids are discarded.

In normal operation, barge is spotted near the mud tanks of drilling rig. Volume of mud, usually 100 bbl, is pumped from active mud system on

*The pump referred to by Mr. Jeffus is a Moyno screw-type rotary pump and is a product of Moyno Pump Division, Robbins & Myers, Inc., 1345 Lagonda Avenue, Springfield 99, Ohio.

Check 3739 opposite last page.

rig to small storage tank on barge. This serves as medium to receive and dilute barite sludge coming from centrifuge to desired density before pumping back to active mud system.

A 2-in rubber suction hose is connected between active mud tank and a second small screw-type rotary pump on barge. Mud is picked up from active mud pit and transferred to centrifuge. Before mud reaches unit, it is diluted with water, whereby a more efficient separation can be effected in centrifuge.

Barite sludge from centrifuge drops into 250-bbl storage tank and is further diluted with water until desired density is reached. A third screw-type pump moves treated slurry from tank on barge to drilling rig's mud system for reuse.

Effluent from centrifuge, containing undesirable low density formation solids, water, chemicals, and oils, flows by gravity to receiving tank on rig. Effluent is later sent to a regulated disposal area.

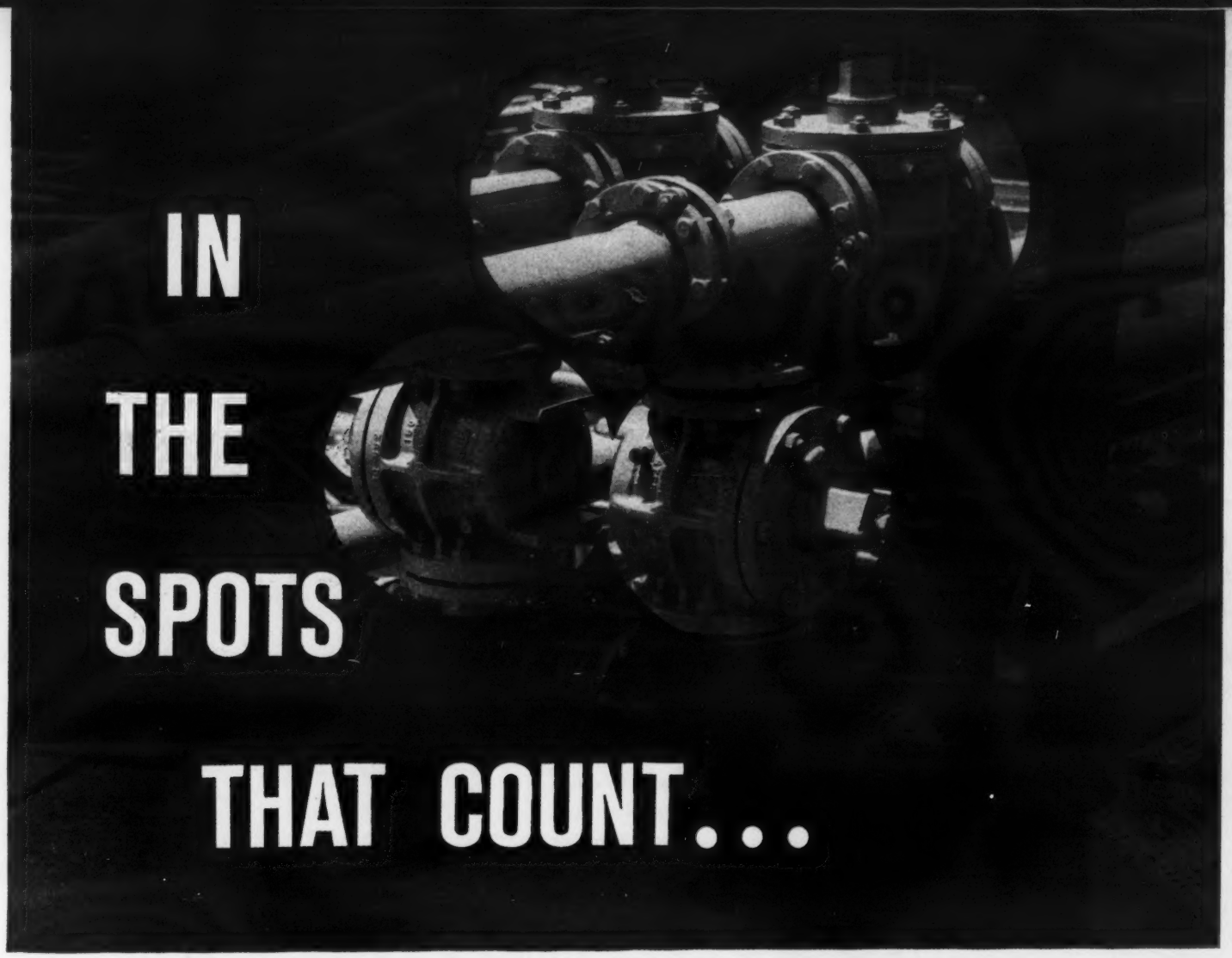
Surplus Mud Also Processed

Surplus drilling mud from 750 bbl tank can be treated in same manner. This becomes an important feature when a well has experienced loss of circulation. Barge can be towed to other rigs operating in the field and take on any excess volume of mud they might have. Surplus mud is treated by centrifuge if necessary, and delivered to rig needing mud. This by-passes need for making up fresh volumes of drilling fluid to combat loss circulation.

(Based on paper prepared by D. M. Jeffus, Jr., Gulf Oil Corporation, Houston 1, Tex.)

NEXT MONTH

First installation in the brewery industry of a recently developed horizontal pressure-leaf filter — which saves plant valuable time through its automatic cleaning feature — is given on-the-spot coverage in a New Solutions highlight.

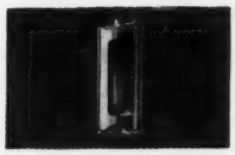


Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber

Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve —same size as the pipe they serve.

A letter or the coupon below will bring you further information on this installation. You may also receive complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.



Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

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☐ Please send me catalog and prices on Homestead Lubricated Plug Valves.
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Company.....

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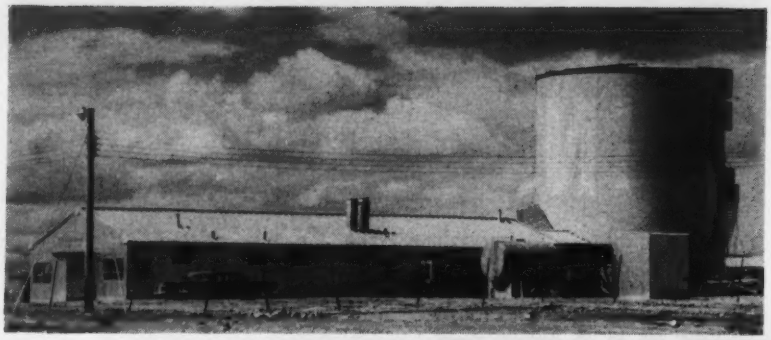
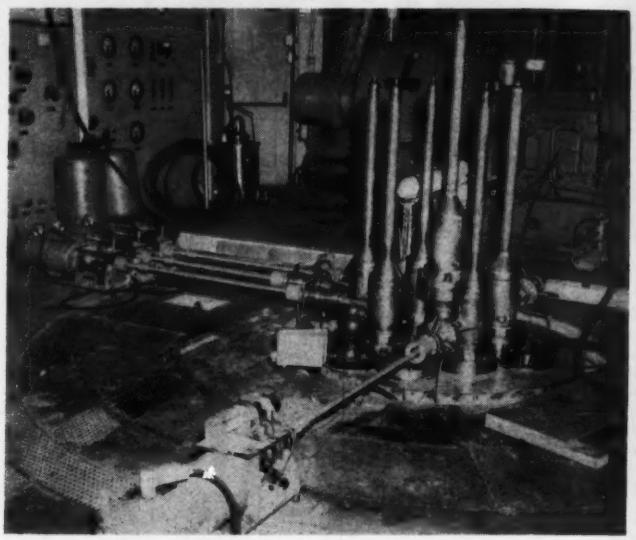
Check 3742 opposite last page



View of ALPR at National Reactor Testing Station in Idaho. Reactor is housed in steel tank at right



Control rod drives and motors, shown with shielding removed

Designed for quick delivery and easy assembly at remote locations, AEC conducts shakedown tests on . . .

Air-transportable nuclear power plant

Latest packaged military reactor incorporates many advance features, can produce 200 kw electricity, 400 kw of space heating

Another packaged nuclear power plant has joined the ranks of the military. Although smaller than the Army's APPR — Army Package Power Reactor (see CHEMICAL PROCESSING, July 1957, pages 139-141) — at Ft. Belvoir, Va., its mission is the same: to provide power to installations located in remote or relatively inaccessible areas.

Designated as the Argonne Low Power Reactor (ALPR), unit is designed to produce 200 kw of electricity and 400 kw of space heat. The power could be used to operate radar equipment. The heat would warm offices, barracks, and other buildings. All components can be easily transported by air.

The prototype plant is located at the AEC National Reactor Testing Station in Idaho where it currently is undergoing an extensive testing program. It is also being used to train military personnel who will operate future package power plants of this type. Official dedication took place on December 2, 1958. Overall cost of project was about $1,986,000.

Since future models will be installed in remote areas, no vapor-tight containment shell around reactor was deemed necessary. Unit is housed in a circular continuous-welded, steel tank measuring 38½′ diam and standing about 50′ above grade. Reactor vessel rests within a lead-shielded support cylinder. Both are surrounded by ordinary gravel, which forms main biological shield. The entire support cylinder and vessel stand on structural steel at bottom of reactor building tank.

Top of gravel is coated with a non-permeable emulsified tar to restrict leakage of radioactive dust or gas. Below reactor, a sheet of metal containing boron helps prevent activation of air in gravel voids by capturing and absorbing thermal neutrons coming through reactor tank.

Operates at 300 psi, 420°F

The ALPR is a direct-cycle boiling water reactor of 3000-kw gross reactor heat, with enriched uranium fuel, and moderated and cooled by natural circulation of ordinary water. Unit operates at 300 psi and 420°F. About 85% of steam is used to generate power. The other 15% bypasses turbine and is used for space heating.

Reactor vessel is ¾″-thick steel, clad with 3/16″ type-304 stainless. Unit is about 15′ high and has 4½′ OD. Core consists of 40 aluminum-uranium alloy fuel assemblies and five control rods fitted into a support-and-shroud structure. Fuel assemblies are expected to have three-year operating life. Only five lb of fuel will be consumed during that time, corresponding to about 1.5 million gal of fuel oil.

New Alloy Used

A new aluminum-nickel alloy, called X-8001, was used as the main fabricating metal for the core and fuel element cladding. Developed by Argonne National Laboratory, the alloy is composed of small amounts of nickel added to aluminum 1100, a commercial

alloy that contains iron. The new alloy is expected to have great resistance to corrosion at high temperatures and pressures. Its use should also cut power costs because the metal is more economical to fabricate and process.

Control rods are made of cadmium and clad with X-8001. The alloy gives extra wear resistance and structural rigidity to the rods.

Steam condenser for ALPR is cooled with air instead of water used in conventional plants. This minimizes water requirements for the installation. Condensers are constructed completely of aluminum. Air is circulated over the finned condenser tubes by a 90″ fluid-drive, 75-hp fan delivering an estimated 93,000 cfm.

Simple and reliable operation and maintenance, with minimum supervision, has been the goal throughout the design of ALPR. Standard components have been used wherever possible. No single component weighs more than 20,000 lb, or is more than 20 x 7 x 9′ in size.

The unit is essentially an extension of the design and operating experience gained from earlier series of Argonne boiling water experiments (BORAX program).

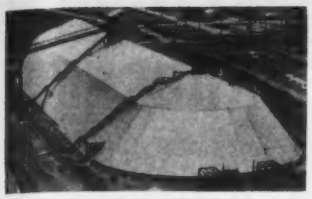
(ALPR was designed and engineered by Argonne National Laboratory, operated for U.S. Atomic Energy Commission by The University of Chicago, Lemont, Illinois.)

(Further information about aluminum air-cooled condensers may be obtained from Modine Manufacturing Co., Racine, Wisconsin.)

Check 3746 opposite last page.

Giant storage building is corrosion-proof, never needs paint

Benefits that can be achieved through use of aluminum siding and roofing are being demonstrated on one of the largest raw material storage buildings in the country. Located at Gramercy, Louisiana, the giant structure is capable



Huge structure houses up to 132,000 long wet tons of bauxite

of storing up to 132,000 long wet tons of bauxite ore.

A clear-span, tepee-type structure 783 ft long, 204 ft wide, and 83 ft high, the building is covered with 235,000 sq ft of corrugated aluminum box ribbed siding and roofing sheet. Building has semi-circular ends and sloped sides and roof to conform to shape of storage pile.

Main structural frames each consist of three hinged arches of built-up plate girders, 204 ft in span and spaced 25 ft on center. Weight of structure per sq ft of building is about 13.5 lb.

Roofing and siding sheet is 0.032 gage with rib configuration 1½ inch deep, 5.33 inch pitch, and 2.125 inch top and bottom flats. Sheet had stucco embossed finish and weighs about 63 lb per 100 sq ft.

Metal was attached to purlins and struts spaced 7 ft, 3 inches on center with 1¼ inch long, stainless steel, screws with neoprene washers. Three-quarter inch screws were used for side laps. Side laps of both roofing and siding were laid with one corrugation lapped in opposite direction of prevailing wind. End laps for siding were 4 to 6 inches for roofing with fastening directly to purlins.

Building is resistant to corrosion and never requires painting. Initial cost was comparatively low because of elimination of light trusswork and laced members from structural frame. Stiffeners on main members were also reduced to minimum.

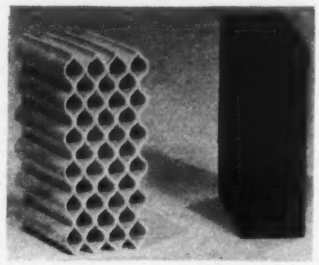
(Further information about use of aluminum in buildings can be obtained form Kaiser Aluminum & Chemical Corporation, 1924 Broadway, Oakland 12, California.)

Check 3747 opposite last page.

Ceramics can be rolled, formed into corrugated, honeycomb shapes

Ceramic heat exchangers, catalyst supports, and other lightweight structural units may soon be commercially available, thanks to new ceramic forming technique developed by Minnesota Mining & Manufacturing Company. Process permits any ceramic material to be rolled and formed into intricate shapes and structures.

Capable of withstanding temperatures limited only by nature of ceramic used, the lightweight structures are expected to find important use in chemical, nuclear, and missile fields. Corrugated, honeycombed, and other high surface area structures when used in heat exchangers or other processing equipment, may open up new applications held back until now by corrosion and temperature limitations. This could result in new or more economic chemical processes.

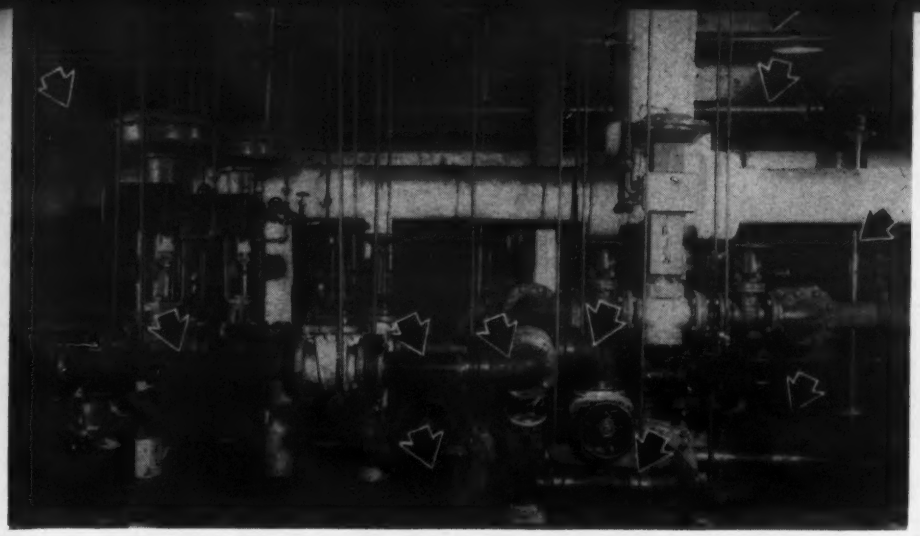


Examples of types of ceramic structures made possible by new forming technique. Zirconium oxide sample at left has 3 corrugations per inch. Bonded silicon carbide unit at right has 7 corrugations per inch. Both samples are 2 inches high

Details for the new technique have not been revealed, but it is known that a ductile ceramic is used at beginning of process. In their final form, the ceramics are no longer ductile.

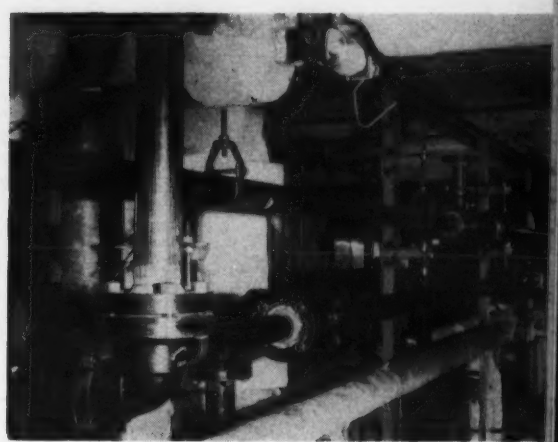
(Further information about ceramic structures may be obtained from Minnesota Mining & Manufacturing Co., St. Paul, Minnesota.)

Check 3750 opposite last page.



Arrows indicate reinforced epoxy resin pipe on second level at Industrial Rayon. Piping handles sulfuric acid, which is filtered after coming from vats below

Epoxy pipe and fittings in another area. Glass fiber reinforcement is visible on vertical section in foreground



Helping in the manufacture of recently developed tough, wear-resistant Tyrex* viscose tire cord, 18,806 feet of —

REINFORCED EPOXY RESIN PIPE RESISTS CORROSIVES ABOVE 150°F

GORDON WEYERMULLER
Associate Editor

AT the Painesville, Ohio, plant of Industrial Rayon where Tyrex* viscose tire cord produced, epoxy resin pipe reinforced with glass fibers is playing an outstanding role. Pipe has been found to provide excellent resistance to both acid and caustic at moderately high temperatures. It has been used extensively in the plant.

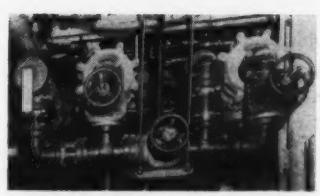
Spin Room

First trial installation of the reinforced pipe at the plant, placed in service in the spring of 1958, was in the spin room. Here the fixative — consisting of sulfuric acid at a temperature above 150°F — passes to the spin heads and is distributed to each spin reel. Pipe was found to well withstand the corrosive acid at this temperature.

Another advantage found for the pipe is the low k factor, which eliminated the need for insulating the supply lines. Heat transfer rate is about .87 Btu/hr/sq ft/°F/inch. Ease of fabricating is another favorable factor shown for pipe on this initial trial.

Original installation proved so satisfactory that in May 1958, conversion of the entire battery of spin machines was begun, using the reinforced plastic pipe. It replaced metal pipe and lined pipe, which had not been as satisfactory.

Industrial Rayon has complete area set aside for cutting and fitting the pipe. Joints are glued, then heated and dried until set



Reinforced epoxy resin fittings on lower level

Viscose Lines

After several of the spin machines equipped with the Fibercast pipe were functioning properly, plant decided to try it on viscose supply lines to replace corrosion-resistant alloy piping. For this application, the pipe handles a cellulose solution containing sodium hydroxide. Pipe has proved to be quite satisfactory for this service.

Plant has a complete area set aside for cutting and fitting the pipe. To date 18,806′ of the pipe and 7881 fittings have been installed in the plant.

Pipe is made by bringing woven glass fibers and epoxy resin together in a high-speed centrifugal casting machine. It is produced in lengths of about 20′, with or without threads. Pipe up to 3½″ OD is made with multiple layers of seamless braid. Pipe 4½″ OD is made with specially designed glass cloth in convolute layers.

Although the reinforced piping is subject to only moderate pressures at Industrial Rayon, it can withstand pressures as high as 1000 psi and temperatures to 300°F.

Pipe has a smooth interior with a Hazen-Williams C factor of 147. This minimizes friction losses, facilitating flow. Pipe is less than ¼ the weight of steel. It has essentially the same linear coefficient of expansion as steel. It is a nonconductor and is not subject to cold flow.

The tough Tyrex viscose tire cord, produced at the plant where the pipe is used, is one of the most recent developments in the synthetic fiber industry. Extensive mod-

*Tyrex is a certification mark of Tyrex Inc. for viscose tire yarn and cord.

ification in the viscose process and in plant equipment have enabled a yarn to be produced that is outstanding for tires.

In a field test presently being conducted on 150 cabs in New York City, superiority with respect to tread wear has been shown on tires made with Tyrex viscose cord. Other tests have shown that tires made with Tyrex viscose cord have high impact resistance and outstanding tread wear at high speeds.

(Fibercast reinforced epoxy pipe is product of Fibercast Company, Div. of Youngstown Sheet & Tube Co., PO Box 727, Sand Springs, Okla.)

Check 3753 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip

Contamination prevented with large stainless steel fittings

Transmit high-purity water at 575°F and 1000 psig

Problem: In the Dresden Nuclear Power Station being built for Commonwealth Edison Company 50 miles southwest of Chicago, absolute integrity of the primary reactor recirculating system is required. This is necessary to prevent escape of water containing radioactive particles which could contaminate the entire plant.

Uses High-purity Water

Reactor recirculating system will handle high-purity water at 575°F and 1000 psig. This is not severely corrosive to carbon steel and low-alloy steels. However, corrosion

Stainless steel fitting being checked with fluid penetrant to assure absence of flaws in recirculating system

product particles would be harmful to the system.

Solution: Reactor recirculating system is being fabricated of 304 stainless steel or carbon steel clad with 304. Forty-two large cast stainless steel fittings are being employed in the system, ranging from 10 to 22″ in diameter.

Fittings were thoroughly tested with fluid penetrant and a radiographic procedure to assure absence of defects. They must meet applicable ASA and ASME codes.

Results: Procedure used to manufacture and inspect stainless steel fittings and other parts of reactor recirculating system give assurance of continuous operation without contamination difficulties.

(Key-Kast stainless fittings are product of W-K-M, division of ACF Industries, Inc., PO Box 2117, Houston 1, Texas.)

Check 3755 opposite last page.

(Erection and installation in the Dresden Nuclear Power Station is being performed by the Bechtel Corporation. This company is working as the engineer-constructor under a contract with General Electric Company.)

CORROSION CONTROL

Ductile titanium tubing, bent into hairpin form, acts as heat exchanger

Problem: Broken heat exchanger tubes threaten expensive chrome plating equipment and cause shutdowns at Van Der Horst Corporation of America, Olean, N. Y.

Additionally, synthetic piping sometimes becomes brittle and breaks easily. Fabricated corrosion-resistant metal tubing has been used, with lengths often joined by welding to obtain sufficiently long piece of tubing. But this has caused trouble because welded joints frequently break due to mechanical damage.

Solution: Ductile titanium tubing, bent in the form of a hairpin and immersed in 25% chromic-acid plating solution, is being used. Bent tubing acts as a heat exchanger.

Plating solution is heated or cooled right in tank by pumping steam or water through tubing, which is installed by connecting to water or steam pipes.

Results: One-inch outer diameter .020-inch wall, grade A-40 seamless titanium tubing costs a little over 1/6 as much as 0.13-inch wall metal tubing that has also been tried. Yet, it is just as inert to chromic acid as this other metal. Titanium has shown no evidence of attack by the acid in more than a year of service.

Long lengths of tubing — 15 ft minimum — make it possible to keep all joints above plating solution because integral pieces are sufficiently long to be bent into required overall length. Tubing itself reaches almost to bottom of tank.

(Titanium tubing is supplied by Superior Tube Company, 1938 Germantown Ave., Norristown, Pa.)

Check 3760 opposite last page.

Floor coatings, chemically resistant, are described in eight-page booklet. Resistant linings are also covered. Bul 2-958-10M — Ralph V. Rulon, Inc., 3900 N. 2nd St., Philadelphia 40, Pa.

Check 3761 opposite last page.

THAT'S INTERESTING

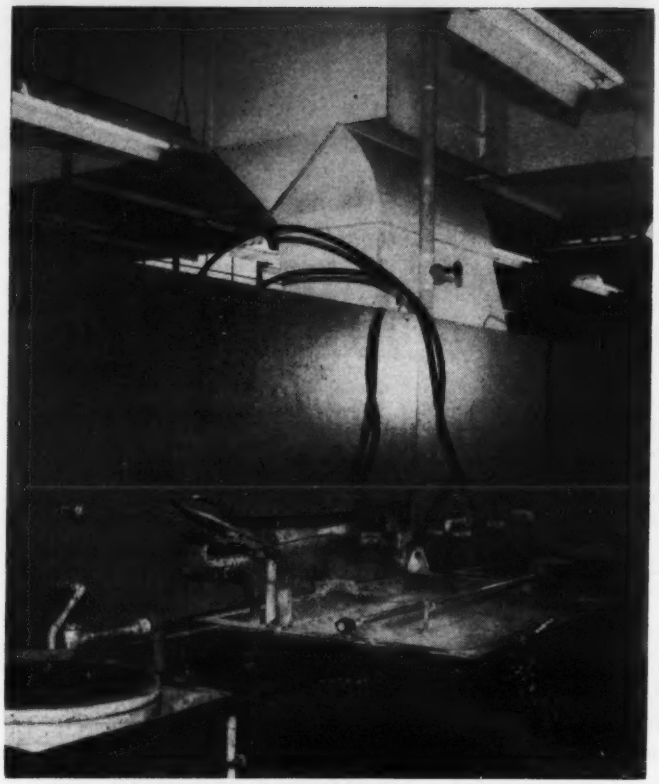
Don't hike, bike

Instead of hiking around the 200 acres of Union Carbide Chemical's plant at Institute, W. Va., supervisory people use bicycles. Messages and small repair parts are also biked to outlying plant sections. Besides being economical and quick, biking provides personnel with some good healthy exercise — helps supervisors win battle of bulge.

Cargo ships underwater

This is not fantasy according to David Brown, President of the Bureau of Ships. Future shipping operations will be conducted in underwater cargo vessels of 100,000 deadweight tons traveling at a speed of 60 knots. Recent developments in nuclear power have removed a major obstacle in the path of this cargo sub development.

For more information on product at right, specify 3764 see information request blank opposite last page.



Plenum behind plating tanks receives vapors through bow-tie opening above tank. Plenum location is on floor in back of tank. With condensibles removed, exhaust system is protected from acid vapors

Corrosion-resistant coating . . .
plus unique plenum system . . .

Controls corrosive action successfully in exhaust system

CP EDITORIAL STAFF

with **EUGENE De WITT,** Plating Supt.
Graflex, Inc., Rochester, New York

Problem: Failure of exhaust system due to corrosive acid used in plating component camera parts at Graflex, Inc. at Rochester, New York was occurring frequently. Fumes from the cleaning solutions were drawn off by an exhaust system for venting to the atmosphere.

As is common in plating shops, duct work of the exhaust system was being replaced constantly. Humidity, with acid and alkali fumes, combined to produce highly corrosive conditions which overcame the protective coating on the exhaust system ducting.

Surface Preparation

Company does chrome, copper, and nickel plating in several finishes. Sulfuric acid and

alkali cleaners are used to prepare the metal surfaces for plating.

Solution: With the building of a new plant, the plating superintendent resolved to overcome, if possible, this corrosion problem. Combination of a uniquely designed plenum and a plasticized furfuryl alcohol coating, together with an easily-adjusted vent have resulted in a simply-constructed exhaust system, yet very resistant to corrosion.

Dark square (at lower right) is end of plenum chamber. Constructed of concrete and protected by acid-resistant paint and glass membrane plenum has shown no signs of corrosive attack. Note cleanliness of area

Contrary to most exhaust systems in which the plenum is overhead or above the exhaust area, the Graflex installation has the plenum on the floor below and behind the tanks. With weight not a factor, plenum is constructed of four-inch cement block, and covered with ¾" marine plywood. A drainage trench a foot wide and approximately four inches deep runs the entire length of the plenum. Drainage goes to a waste disposal unit. The block wall is covered with an acid-proof lining as is the marine plywood. Space above the plenum is used for service and utility lines.

Bow-tie Exhaust

Because of the relatively large size of the plenum and temperature gradient encountered by vapors entering the plenum, most condensibles in the exhaust gases are removed before going to the overhead exhaust fan.

The exhaust immediately

over the plating tanks has bow-tie opening in the panel. This extends the complete width of the tank and has a damper to control velocity. Draft velocities are measured with a pitot tube.

Acid-proof lining in the plenum is a membrane consisting of layers of polymer and glass fiber. The first is polymer, the second is glass, the third is polymer again, and so on. Layers are applied separately. The lining used is based on a plasticized furfuryl alcohol polymer which dries at normal temperature to a hard, glossy, black film.

Adhesion is said to be excellent to wood, hardboard, and other fibrous surfaces. When applied on concrete, a primer must be used. Application time extends over ten days. Chemical resistance of the polymer is such that it is suitable for all acids except highly oxidizing or reducing types. It is resistant to alkalis and most solvents.

Iron Exhaust Ducts

Exhaust duct which leads into the plenum from the bow-tie opening is of black iron. All metal used for exhaust ducts is a 14-gage black iron with a heavy coat of vinyl acid resistant paint applied on exterior. Interior of ventilating duct is lined with a ⅛"-thick lining based on a plasticized Gilsonite fibrous filled formulation applied to the sheet metal by spray gun in three layers. Two additional sealer coats of an air-drying phenolic coating were then applied over the three base coats of plasticized Gilsonite material.

This forms a chemically resistant fiexible lining that acts as its own gasket when applied to flange faces. Chemical resistance of this lining is suitable for all acids, alkalis and salts encountered in pickling and plating operations.

Results: The plating superintendent reports that in the one year since the exhaust system has been in use, no evidence of rust and corrosion has been found in the overhead exhaust lines. The fan system, consisting of two 32,-

000-36,000 cfm units, displays no evidence of rust. Examination of the plenum interior has indicated that the acid-proof lining is withstanding the corrosive fumes without any difficulty.

(Ceilcote F-100 and spray Grade #8314 are products of The Ceilcote Co., Inc., 4832 Ridge Rd., Cleveland 9, Ohio.)

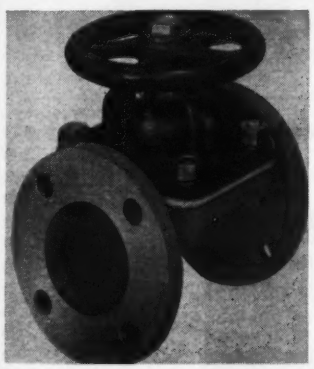
Check 3769 opposite last page.

Higher operating temps, better chem resistance—with lined-valve

Uses: For corrosive services.

Features: Units operate at temperatures up to 300°F and have improved chemical resistance at high operating temperatures.

Description: Diaphragm valve is lined with Penton, a



Chlorinated polyether-lined diaphragm valve operates at temperatures up to 300°F

chlorinated polyether. Valves are available in cast iron or aluminum bodies, and are suited for use with metal, plastic, glass, or lined pipe.

Hand-wheel, quick-opening, air, or electric operators are available. Sizes range from ½ to 6", with flanged ends. Valves have packless construction and working parts isolated from flow. Maintenance is simple, and bonnet parts and diaphragms are interchangeable with similarly sized valves.

(Penton-lined diaphragm valve is product of Hills-McCanna Company, 4571 W. Touhy Ave., Chicago 26, Ill.)

Check 3770 opposite last page.

Tantalum-lined reactor offers 4 industries new corrosion-battling tool

All surfaces which contact product are protected

A reactor lined with corrosion-resistant tantalum has been developed with an eye toward usage in the chemical, food processing, pulp and paper, and atomic energy fields.

Initial effort is a 30-gal vessel, although manufacturer reports it is ready to custom fabricate tantalum-lined reactors immediately.

The 30-gal reactor is designed to operate at 650°F and 500 psi. Chamber consists of a .030 tantalum liner with a ⅝" outer shell of Type 430 stainless steel.

Manufacturer reports that all surfaces which contact product are tantalum. These include a turbine-type, tantalum-sheathed agitator shaft, solid tantalum agitator and baffle, and tantalum immersion type bayonet heater. Vessel, without drive, weighs approximately 700 lb.

(Reactor is manufactured by The Pfaudler Co., a division of Pfaudler Permutit Inc., 1078 West Avenue, Rochester 3, New York.)

Check 3774 opposite last page.

(Tantalum liner is produced by Haynes Stellite Company, Kokomo, Ind.)

Check 3775 opposite last page.

Corrosion-resistant pipe of impervious graphite fitted easily in field

System uses glass fiber armor

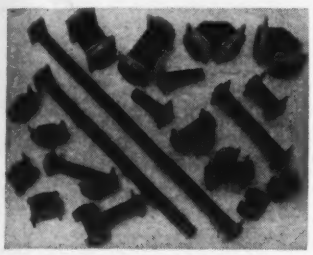
Uses: For handling corrosive fluids.

Features: System can be fitted easily in field with only hacksaw and wrench because it is made of impervious graphite. Wall thickness is approximately twice that formerly used.

Description: Impervious graphite pipe system utilizes glass fiber armor to protect against physical abuse. Stand-

ard ASA flange bolt circles permit attachment to existing equipment or other pipe, and the I.D. dimension equals listed pipe size dimension to simplify calculations.

Impervious graphite material from which pipe is extruded is not affected by corrosives, except a few highly



Short lengths of impervious graphite pipe can be easily made up in field

oxidizing agents. It is non-contaminating and immune to effects of thermal shock. Pipe is recommended for use at temperatures to 340°F at pressures to 75 psi hydrostatic (50 psi steam).

(Impervite pipe system is product of Falls Industries, Inc., Aurora Road, Solon, Ohio.)

Check 3778 opposite last page.

Alloy resists corrosion better than titanium in certain media

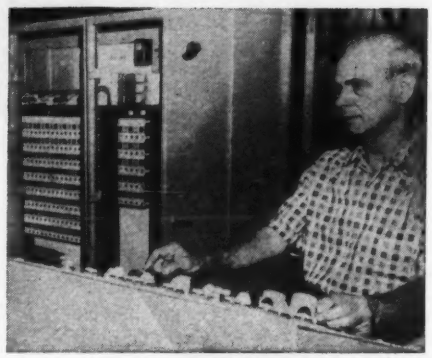
A titanium alloy containing 2½% aluminum and 16% vanadium has shown better corrosion resistance than pure titanium in certain media. One of four titanium alloys developed by company, it provides a material which can be easily worked in a low strength condition and then age-hardened or strengthened to high tensile strength.

It exhibits a high tolerance for hydrogen, at least 500 ppm. This is four times the existing hydrogen tolerance of present commercial alloys.

(MST-2½ A1-16V titanium alloy is development of Mallory-Sharon Metals Corp., Niles, Ohio.)

Check 3779 opposite last page.

AUTOMATIC Palletization System *SPEEDS* In-plant Warehousing



Only one operator is required to control the vast sorting and accumulating system which entailed installation of more than 7300 ft of complex, electronically controlled conveyors driven by over 200 electric gearmotors.

Contained in the cabinet to operator's right are solid-state control and memory units for the maze of accumulating conveyors. These units have been incorporated into an electric static control system in place of conventional relays.

Conveyors keep each item in a separate line until enough boxes or bags have accumulated for a pallet load. Then, preset programming controls select proper loading pattern without operator's attention, and route items to correct palletizer. Accumulating and sorting lines are suspended 40 ft in air to utilize space between roof and first floor.

From the accumulating system, boxes, bags, and bales are sent to one of eight palletizers. These are extra large in order to handle oversize pallets, which measure 60" x 40".

Palletizers fashion items into an interlocking pattern on a stripper plate. When layer is full, it is deposited atop preceding layer on pallet. When pallet is full (its load size is predetermined automatically), it moves out onto a chain-driven live roller conveyor take-off system. An empty pallet is brought into place from automatic magazine in the palletizer.

Loads are accurately stabilized in bag palletization system. Lateral spacing blocks on five of the eight palletizers are lowered from a traveling carriage above the palletizer as each layer is laid down, thus providing space to position each bag properly in the stack for greatest stability.

Reciprocating vertical conveyor (left) brings empty pallets to palletizer floor, where they are moved by fork truck to palletizers.

Another conveyor (at right background) lowers loaded pallets to first floor, where fork trucks speed them to specific areas from which rail, truck or water shipments emanate.

THIS PICTURE STORY presents some of the highlights in operation of the $1.6-million completely automated palletization system at the huge cane sugar refinery warehouse of California and Hawaiian Sugar Refining Corporation Limited, Crockett, Calif.

C and H installation pioneered the mechanical sorting, accumulating and palletizing of bagged items in 25-, 50-, and 100-lb sizes.

(Automatic palletizers and warehouse control system were engineered by C and H personnel and Lamson Corporation, 303 Lamson St., Syracuse 1, N. Y.)

Check 3781 opposite last page.

(Sorting station static control system is product of General Electric Company, 1 River Rd., Schenectady 5, N. Y.)

Check 3782 opposite last page.

SEVEN IMPORTANT RESULTS of C and H's PROGRAM

Here's what California and Hawaiian Sugar achieved by mechanizing its in-plant warehouse handling at its Crockett, Calif., cane sugar refinery.

1. **Increased efficiency of manpower.**
2. **Reduced damage to packaged sugar, an inherent result of hand palletization.**
3. **Eliminated costly rehandling and higher container costs — also inherent to hand palletization.**
4. **Improved stacking of boxes, bags, and bales.**
5. **Made better use of storage area because of better balanced and more uniformly stacked pallets.**
6. **Facilitated flexibility in warehouse handling. Formerly, workers had to change conveyor route manually. Now, only a few switches must be reset whenever a product changeover is necessary.**
7. **Removed safety hazard to workers by the elimination of much of the heavy lifting involved in warehouse palletizing operations.**

Loaded pallets are discharged onto a common conveyor (upper left) located between the two lines of palletizers.

By means of a preset switch arrangement, each of the eight palletizers routes loaded pallets by means of two turntables, shown here, to one of three vertical conveyors or to storage area on same floor.

Special heavy-duty 'V' type belt . . .

. . . actuates this power-driven live-roller conveyor. Conveyor is manufactured with straight face or tapered rollers in various diameters and lengths of rollers to suit particular application. Standard 4'6" and 6'0" radius are manufactured. Curves of 45°, 90°, and 180° are available.

(Power driven live roller conveyor is manufactured by Sage Equipment Company, Inc., 32 Essex St., Buffalo 13, N.Y.)

Check 3785 opp. last page.

Pick-up and drop-off of 40-cu-yd loads done from cab

Cuts costs, ups efficiency

Uses: System is designed for handling bulk materials in detachable containers.

Features: Entire operation of system can be performed by truck driver. Ability of one truck to handle any number of containers cuts down on investment in maintenance, insurance, licensing, and capital outlay for fleet of rolling stock. Containers can be loaded and unloaded at convenience of shipper or receiver without tying up truck or truck crew.

Description: Detachable containers are mounted on single-axle or tandem-axle truck. System is designed to handle

containers in capacites to 40 cu yd and 30,000-lb net payloads. Single lever, mounted on dashboard inside cab, enables truck driver to pick up, haul, or drop off containers. Unit is powered entirely by hydraulics, assuring accurate control and high degree of safety.

Detachable containers are available open or closed. Sizes range from flat bed to 10-, 15-, 20-, 25-, and 30-cu-yd standard units. Special containers are available to 40-cu-yd capacities. All closed containers are equipped with two top charging doors that open to expose an unobstructed charging area of 70½ x 177". Containers are tapered to give a wider opening at rear discharge area for clean, complete dumping.

Using a single lever, mounted on dashboard inside cab, truck driver can pick up, haul, dump, or drop off any number of detachable containers

(Huge Haul system is manufactured by Ingersoll Kalamazoo Div., Borg-Warner Corp., 1810 North Pitcher St., Kalamazoo, Michigan.)

Check 3786 opposite last page.

Check 3787 opposite last page

Check 3788 opposite last page

Check 3789 opposite last page

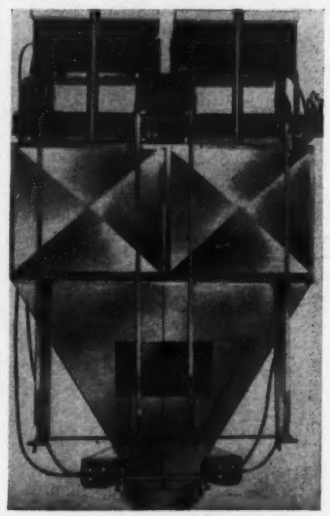
Speedy, accurate filling; single, dual operation with packing scale

Unit fills 50-lb bags at rate of 30 per minute

Uses: For weighing and bagging bulk materials.

Features: Unit can accurately fill thirty 50-lb bags per minute. Double feeder permits either single or dual operation, and control panel provides operator with continual view of scale's operational cycle.

Description: Automatic duplex filling unit consists of two net weigher scales discharging into a common hopper. In operation, a supply feeder feeds material to the weigh hoppers. As one is being filled and weighed, the other is discharging into the bag.



Capable of either single or dual operation, automatic duplex filling unit accurately fills up to 30 bags per minute

Scale can be either manually dumped by a foot switch or automatically dumped into empty packages on a synchronized conveyor. Unit can be set to make from 25 to 30 dumps per minute for package capacities of 25 to 100 pounds each.

(Model 2N18CC automatic duplex filling unit is product of Thayer Scale Corporation, Pembroke, Mass.)

Check 3790 opposite last page.

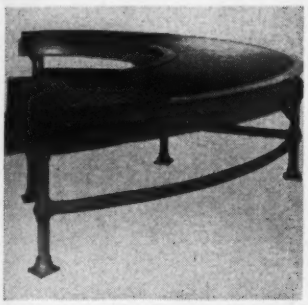
Check 3791 opposite last page

Check 3792 opposite last page

Long mesh-belt life for conveyor curve

Uses: Designed for conveying products around curves. Open construction fosters circulation of air or heat, draining of liquids.

Features: Minimum metal-mesh belt wear, since belt is woven to taper to fit inner and outer radii of curve. Thus, there is no lateral flexing as it



Moves 2000-lb loads at speeds to 200 fpm

negotiates turn. Belt slides on nylon slider rails, or full-width wood slider bed, further minimizing wear because of the low friction.

Description: Conveyor is complete section utilizing woven-wire belt, welded structure, tubular steel supports, adjustable takeup, and, if desired, its own drive system. It will carry 2000-lb load at speeds to 200 fpm.

Rods are inserted through spirals of the mesh and connected to multiplane chains which travel along inner and outer edge of curve. Chains are sprocket-driven at each tapered end pulley.

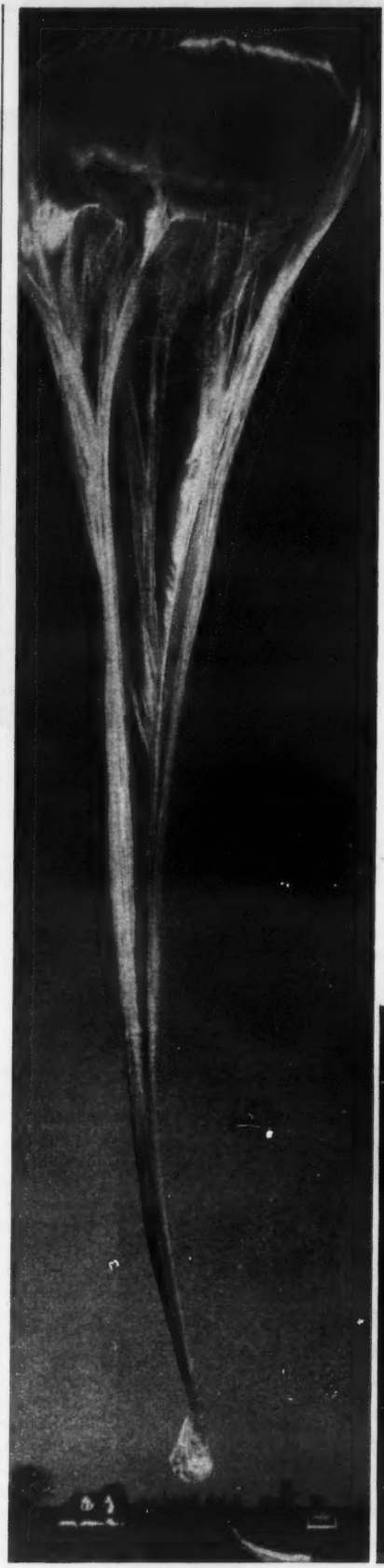
Any reasonable belt width may be turned on 24" minimum inside radius.

(Taperweave curve conveyor is product of Wiretyer Corporation, 65 Leliarts Lane, East Paterson, N. J.)

Check 3793 opposite last page.

Rack framing by slotted angles is described, two pages of photographs show various assembly methods, give data and load tables in Bul 958 — The FlexAngle Corp., 3760 Oakwood Ave., Youngstown 1, Ohio.

Check 3794 opposite last page.



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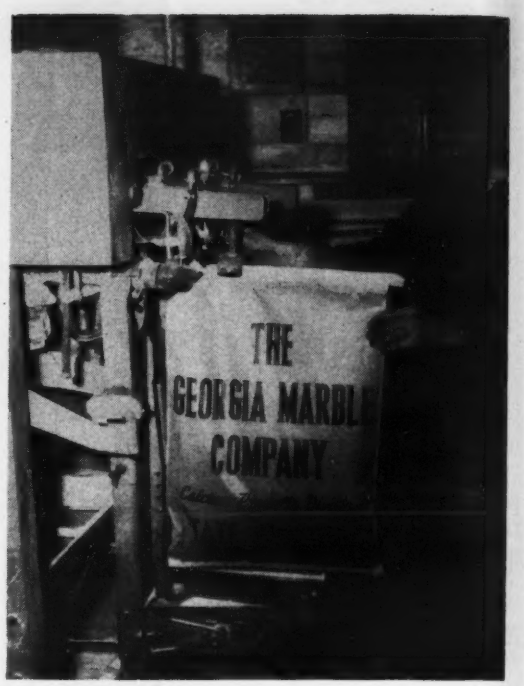
Because no moving parts of filling machine come into direct contact with material, maintenance is practically unnecessary



Packaging machine that operates with minimum of dust and maintains accurate weights without slowing production . . .

Fluidizes calcium carbonate, soothes packaging headache

Two-tube fluidizing filling machine permits packaging of calcium carbonate with accurate weights and a minimum of blow-back

Problem: The fineness of dry calcium carbonate, plus its heavy weight, made it impossible to obtain a satisfactory packing operation with conventional packing equipment at Georgia Marble Company, Tate, Georgia. The calcium carbonate ranges in size from 18 mesh to fine dust, and weighs approximately 95 lb per cu ft.

Solution: Installation of a machine that fluidizes the material makes it possible to package the calcium carbonate satisfactorily.

This fluidizing operation is achieved when compressed air is introduced at low pressure through an air pad at bottom of conditioning chamber, surrounds particles of material at base of chamber, and makes them buoyant or fluidized.

Weight of material in conditioning chamber and supply bin above creates pressure on these fluidized particles and ejects them through a filling tube into bag. "Heads" of material required can

vary from 6 to 18 ft, depending upon characteristics of product.

The Georgia Marble installation consists of a two-tube filling machine. However, the machine is available in single- and multiple-tube models to permit production ranging from 1 to more than 20 bags per minute. It is adaptable for both hand and automatic discharge mechanisms.

Results: Fluidizing the material makes it possible to package the calcium carbonate with a minimum of dust and blow-back, and to maintain acceptable weight tolerances (variation is seldom more than plus or minus four ounces) without slowing production. According to plant superintendent, expanding valve sealer eliminates blow-back from valve during filling cycle, and permits extremely clean operation.

Georgia Marble's production manager says that no maintenance has been required during an eight-month period of machine operation. This is attributed to the fact that no moving parts come into direct contact with the material.

Less aeration of the product is another advantage of the machine. This makes possible a savings in bag size for many products.

(Fluopacker filling machine, originated and manufactured by Food Machinery and Chemical Corporation, is sold and serviced exclusively by St. Regis Paper Company, 150 East 42nd St., New York 17, New York.)

Check 3798 opposite last page.

Material handling equipment leasing methods are detailed in four-page circular that discusses three plans to acquire equipment without tying up working capital. Leasing circular — Lewis-Shepard Products, Inc., Dept. R8-26, 125 Walnut St., Watertown 72, Mass.

Check 3799 opposite last page.

Vibratory dryers and feeders for heavy and extra-heavy duty are shown on two-page Data Sheet PO 47073 — Syntron Co., 110 Lexington Ave., Homer City, Pa.

Check 3800 opposite last page.

New Invention Picks Up 40 Cu. Yd. Detachable Containers . . . 15-Ton Loads

Dinosaur picks up in excess of 30,000 pounds of granular material, white line inside container indicates load has not shifted.

DEMPSTER-DINOSAUR Combines Detachable Container Flexibility With Big Pay-Load Capacity

Unlimited Capacity

The proven savings of mechanically handled detachable containers have now been expanded to cover long, over-the-road hauls. Two DINOSAUR models are available for this work. One, for tandem trucks, handles 30,000 pounds; the other, for single axle trucks, handles 22,000 pounds. Special off-the-road models are available for loads limited only by the capacity of the truck.

For Docks and Flat Cars

Mechanically, the DEMPSTER-DINOSAUR is of extremely simple design. Components are a tipping frame, two hydraulic raise-and-lower cylinders and a double-acting cylinder which controls all container movements. No chains, sheaves or cables are used in its operation. It is the only over-the-road system that can push and pull containers on and off docks or railroad flat cars. This makes it possible to use the DINOSAUR in conjunction with "boxy-back" containerized cargo rail shipments.

The Dinosaur hydraulically pushes a container off on a dock and inside a building for unloading.

Many Sizes and Types of Containers are Available

DEMPSTER-DINOSAUR standard containers come in 21 sizes ranging from 14½ feet to 23½ feet in length and 10 to 41 cu. yd. capacity. Special cargo containers up to 35 feet, tank-type and stake side models are also available. Drop-down telescopic legs to hold container at dock height are optional on some cargo containers.

Free Booklet Offered

A free booklet which describes the operation of this new system in detail is offered by Dempster Brothers, the originator and only manufacturer of DEMPSTER-DUMPSTER Systems.

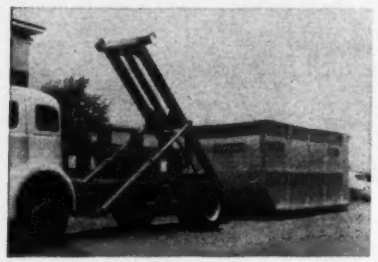
Mfd. By Patents Pending

DEMPSTER BROTHERS, Inc.

Dept. CP-2, Knoxville 17, Tenn.

Containerized Cargo, Waste & Raw Materials Handled by DINOSAUR

The newly developed DEMPSTER-DINOSAUR is a system of materials handling that employs giant containers up to 40 cubic yards and larger. It lends itself to any situation where bulk accumulations of raw materials, liquids, waste or finished products must be handled. Since one truck and one driver can automatically pick up, haul and dump or set down a number of containers, the DINOSAUR easily does the work of several trucks.



Dinosaur backs up to loaded container and engages it with lifting bail.

Container is hydraulically pulled up inclined tilting frame.

Container is pulled forward where it automatically locks into carrying position.

Check 3802 opposite last page

Five-gal open-top pails filled, labeled, crimped by automatic machine

Only two men needed to run straight-line equipment

Uses: Packaging viscous materials — oils, adhesives, and paints — in 5-gal open-top pails.

Features: Machine operates on "no can, no fill" principle. Series of safety devices prevents spillage or overfill of containers. Cut-off is clean and leaves no drippage. Two men can operate machine. Production rate of 8 to 16 containers per minute can be attained with 2-4 nozzles.

Description: As container enters filling portion of machine, each of a series of air-operated nozzles deposits a partial quantity of material. One filling head has weight-controlled fill so that correct amount of liquid is utilized for end consumption.

When filling cycle is completed, container enters labeling area. This operation is activated by the container on the principle of "no container, no label." Label receives an overall glue pattern from roller.

The first stage of pressure applies label to pail, which then travels into wiping and pressure stations. Crimping station is next stop. Cover normally is placed on container manually, but it can be done automatically.

Crimping head operates in vertical motion, and is synchronized with rest of operation. As container arrives under crimping head, the head is automatically lowered onto container and crimps cover onto pail.

Unit is approximately 20 ft long, is self-contained to complete all operations. It is of straight-line intermittent-motion design, constructed with a double-strand 4½" stainless-steel chain conveyor with variable control.

(Automatic straight-line filling, labeling, and crimping machine is manufactured by MRM Company, Inc., 191-3 Berry St., Brooklyn 11, N.Y.)

Check 3803 opposite last page.

GAYLORD DEPENDABILITY
KEEPS YOUR PRODUCTION ROLLING

You get a clear track to corrugated boxes when you signal Gaylord to start the run. In all lines of industry, Gaylord has a well earned reputation for delivering the packaging . . . so you can package and deliver the goods . . . on schedule.

Regular corrugated containers in big volume runs, or engineered packaging, give your G-Man the green light . . . keep production rolling profitably.

GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

For more information on product at right, specify 3804 see information request blank opposite last page.

Wire-mesh conveyor belt in service at International Minerals

Bag breakage less with wire-mesh conveyor

Maintenance costs cut 60%, while lost production in making repairs to conveyor is six times less than the old way

GORDON WEYERMULLER, Associate Editor
with **T. L. HOLLAND,** Production Superintendent
International Minerals & Chemical Corporation
Tupelo, Mississippi

Problem: Excessive maintenance and lost production time occurred with slatted, chain conveyor belt formerly used for fertilizer bagging operation at International Minerals. Conveyor moved the bagged fertilizer from weighing unit to and through bag sewing machine.

Solution: In the fall of 1954 plant placed a Wissco wire-mesh conveyor belt in service. Belt is constructed of carbon steel thin spiral. Flat supporting surface prevents stretch and distortion. Welded knuckle-edge prevents edge wear and damage. Belt is 15" wide.

As shown in photograph, conveyor belt is driven across smaller rollers by means of large pulley (left) covered with rubber belting. Rollers are mild steel which is softer than belt edge to decrease wear on belt. Belt is guided on bottom side about midway between ends.

Bag closing head is adjustable so it can be moved up or down to accommodate different size bags. Both 50-lb and 100-lb open-mouth multiwall bags are used. Production on 50-lb bags is 18/min and on 100-lb bags it is 16/min.

Results: Bag tearage and breakage has been less since the wire-mesh belt was installed. Maintenance cost on belt has been reduced 60%.

Total annual cost for conveyor parts, maintenance, and bag breakage has been cut 64% or to about one-third the previous cost. Less maintenance has lowered production time lost in making repairs to 1/6 what it was with belt previously in use.

Bag closer has given dependable service, has required practically no maintenance during the four years it has been in operation. Plant has four other bag closers of this type in use.

(Wissco belt is product of Wickwire Spencer Steel Div., the Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, New York.)

Check 3806 opposite last page.

(Style 80600 E bag closer is manufactured by Union Special Machine Co., 400 N. Franklin St., Chicago 10, Ill.)

Check 3807 opposite last page.

Heated trough liner plates permit efficient feeding of damp materials

Uses: For feeding bulk materials.

Features: Electrically heated trough liner plates facilitate efficient feeding of high-moisture-content bulk materials. Build-up of damp or wet materials in feeder trough is eliminated. There is no downtime for trough cleaning.

Description: Heavy-duty and extra-heavy-duty electromagnetic vibrating feeders are equipped with electrically heated trough liner plates.

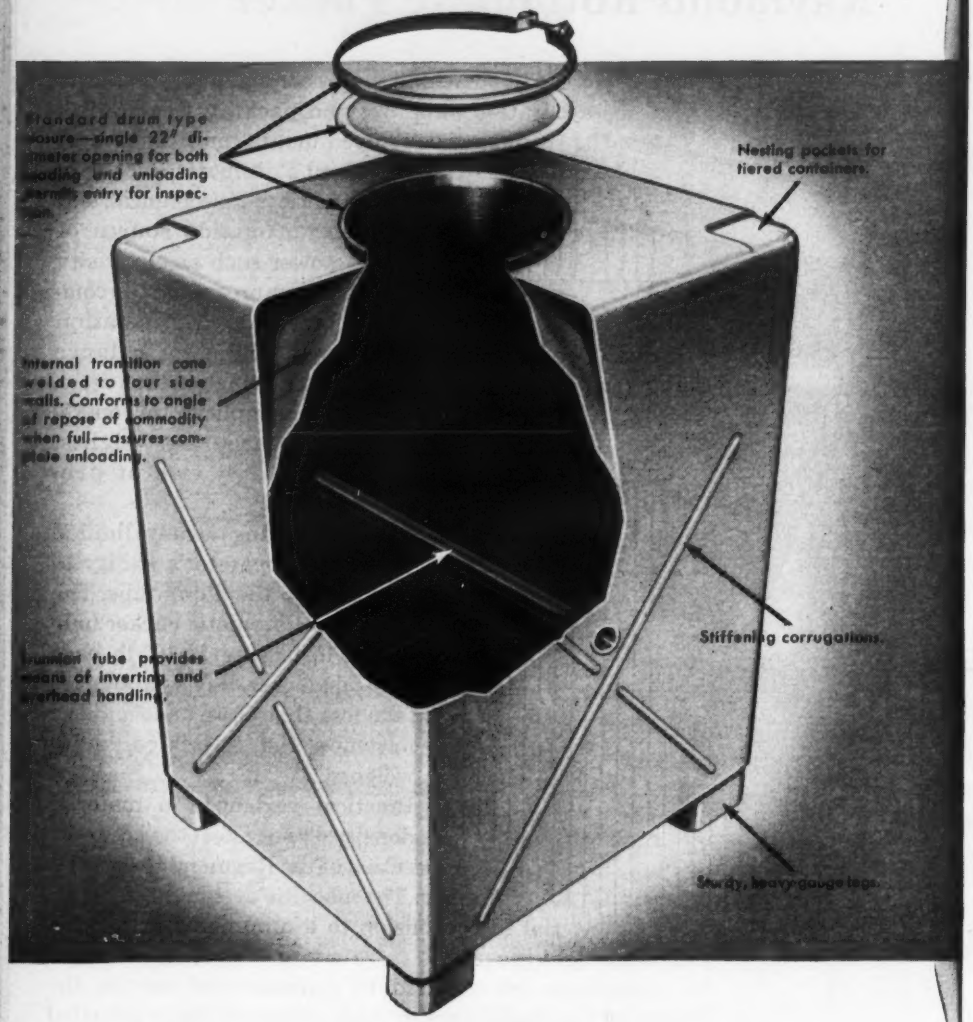
Plates will most effectively handle various grades and types of sand, gravel, stone, ore, clay and other hard-to-feed bulk materials having moisture contents of 15-25%.

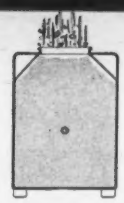
Liner plates are rated for continuous operation and can be easily adapted to controlled intermittent operation by means of moisture percentage timer.

(Vibrating feeders with electrically heated trough liner plates are product of Syntron Company, 110 Lexington Ave., Homer City, Pa.)

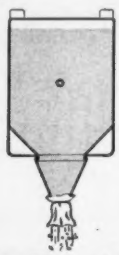
Check 3808 opposite last page.

New Powell Invert-a-bin slashes bulk handling costs

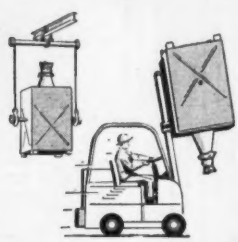




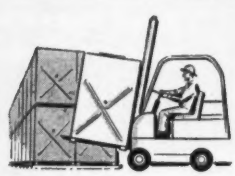
Fills Fast—22" opening permits fast filling of even powdered materials. Internal cone conforms to angle of repose.



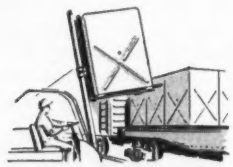
Empties Clean — Internal cone funnels all materials out of bin. No residue remaining.



Used Anywhere—Standard handling equipment—no fancy unloading devices needed at every use area.



Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.



Cuts Shipping Costs — low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

For bulk handling dry granular or powdered materials—sugar—flour—plastics—chemicals—cement—etc.—in plant or between plants, the new patented Powell Invert-A-Bin made of steel or aluminum is the simplest, most versatile container ever developed.

Easily filled, easily inverted, quickly emptied, the Invert-A-Bin can be used anywhere without special devices at each use point. It stores safely outside, lets you take advantage of many transportation economies. Invert-A-Bins eliminate the use of disposable packages and bring you all the advantages of a bulk handling system without the costly investment. Get all the facts—write today for your copy of the Invert-A-Bin, Semi-bulk handling brochure.

POWELL PRESSED STEEL Since 1920 HUBBARD, OHIO

THE POWELL PRESSED STEEL COMPANY

HUBBARD, OHIO

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 47.

For more information on product at left, specify 3810 see information request blank opposite last page.

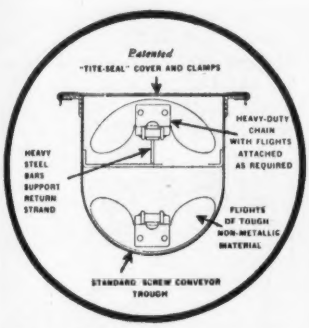
Many bulk materials conveyed quickly in compact unit

Uses: For conveying bulk materials.

Features: Unit will handle variety of abrasive or non-abrasive materials without requiring separate return strands. It is self-cleaning, compact, and fast.

Description: Conveyor consists of a series of flights carried by chain fitted with attachments, all enclosed and operating within a conventional screw conveyor trough. Any convenient type of drive can be used.

Deep loads can be carried either horizontally or on any incline. Shape of flights fits



Compact, self-cleaning conveyor handles variety of bulk materials

contour of trough, providing positive wiping and cleaning action. Flights are constructed of special tough, non-metallic material, assuring smooth, quiet operation.

Return strands of conveyor are supported by special iron guide carried on cross steel supports entirely within trough. Discharge from trough may be at any point desired. Receiving spouts can be located to suit conditions.

("Hy-Flo" conveyor is product of Screw Conveyor Corporation, 700 Hoffman St., Hammond, Ind.)

Check 3811 opposite last page.

Corrugated belts, non-porous and non-marking, for handling wet, sticky materials are detailed in two-page Data Sheet 2470—B. F. Goodrich Co., Akron, Ohio.

Check 3812 opposite last page.

Check 3813 opposite last page

How Much Steam Should a Steam Trap Trap?

. . . some answers to commonly asked questions about the primary job of a steam trap

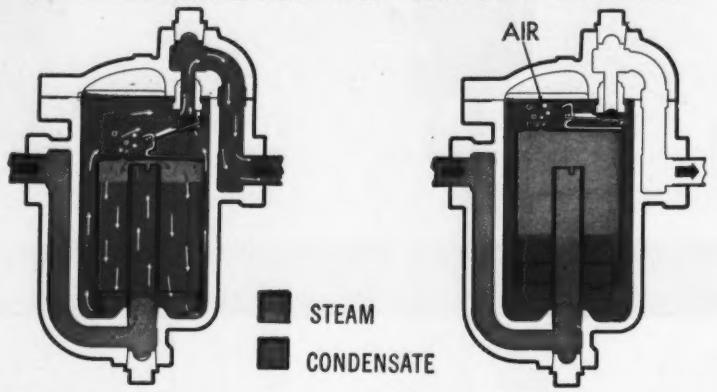
You don't need a doctor's degree in thermodynamics to answer the question at the top of this page. Naturally, a steam trap should trap *all* the steam.

Unfortunately for you, the problem isn't quite that simple. After all, a shut off valve would trap all the steam . . . and condensate, and air, and carbon dioxide as well.

So we'd better amend the answer to the question this way: A steam trap should trap *all* the steam but *must* remove condensate, air and carbon dioxide as rapidly as they accumulate.

With this established, let's take a closer look at what's involved:

HERE'S THE STEAM TRAP DESIGN THAT GETS RID OF CONDENSATE AND AIR WITHOUT STEAM LOSS



Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

A Steam Trap Should Trap All The Steam

If you've had experience with several different makes of traps, you already know that some trap steam better than others. The operating principle of the trap is what makes the difference. We like to talk about it because Armstrong traps are designed so that no steam can get to the orifice. The valve is always water sealed. Result: *More efficient steam utilization, lower fuel costs.*

A Steam Trap Should Remove Condensate

All traps remove condensate—after a fashion. For maximum efficiency in the unit being drained, though, the trick is to get it out without waiting for it to cool and without leaking steam.

Armstrong's water sealed valve takes care of steam leakage. The inverted bucket operating principle opens the trap for water regardless of its temperature. This means you get the condensate out as quickly as it accumulates. Result: *Higher temperatures and better heat transfer in steam heated units.*

A Steam Trap Should Remove Air and CO_2

Part and parcel of the condensate removal problem is removal of air as well as oxygen and carbon dioxide—two real troublemakers. Air tends to reduce operating temperatures and interfere with heat transfer. CO_2 goes into solution to form corrosive carbonic acid which, for example, can eat unit heater tubes. O_2 aggravates the situation. Believe it or not, but all traps don't properly remove air and CO_2.

By now, you've probably guessed that Armstrong traps *do* remove air and CO_2. Armstrong design (see illustration) provides continuous venting of air and CO_2. By opening suddenly, the Armstrong trap creates a momentary pressure drop to "pump" the air down to be vented. Result: *Higher temperatures, faster heat-up, better heat transfer and reduced corrosion.*

Note: When required, specially sized air vents are furnished. For fast heat-up of low pressure on-and-off units, Armstrong provides open float and thermostatic air vent traps.

What's the Final Answer?

Summing it all up, you'll get the best service from steam heated units that are equipped with traps designed to trap *all* the steam and remove air and condensate as quickly as it accumulates. In our prejudiced viewpoint, this means Armstrong traps. More important are the several thousand users of Armstrong traps who have proved the point.

Before you make up your mind, though, consider the minimum maintenance requirements of Armstrong traps . . . and the convenient assistance your local Armstrong Representative provides. These are important plus values.

Put Up or Shut Up

We're so confident that we "put up". Armstrong traps are unconditionally guaranteed to satisfy. So you can find out for yourself with practically no risk. If you're not completely satisfied with the way they do their job, you can get your money back.

* * *

The 44-page Armstrong Steam Trap book goes into greater detail on these and other Armstrong features. It also discusses trap selection, installation and maintenance. Ask your Armstrong Representative for a copy or write

Armstrong Machine Works
8805 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

Check 3814 opposite last page

Visual balance indicator permits on-spot check of weighing errors

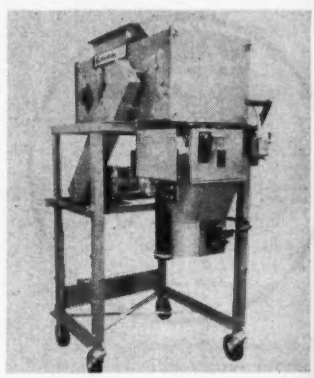
Indication is rapid, accurate, and stable

Uses: Unit was developed to meet needs of small plants for inexpensive one-man bagger.

Features: Eye-level visual balance indicator permits on-the-spot elimination of weighing errors.

Description: Gross bagging scale, with feeder, bags non-free-flowing materials at low initial and low operating costs.

Designed for use with open-mouth textile and multiwall paper bags, bagging scale provides accurate filling of 10- to 140-lb bags. Indicator operates on torsion principle so that indication is rapid, accurate, and stable.



Provides accurate filling of 10- to 140-lb bags

Bag is slipped on an oval spout and is held in position by bag holder. Operator pulls gate handle, which opens scale inlet gate and starts belt feeder. When weigh beam comes to balance, scale inlet gate closes and feeder stops. Visual balance indicator shows true balance.

Compensation arrangement automatically cuts off scale at accurate weight. Slide attachment permits serving many spouts, and scale is easily detached from feeder.

(GA-17 gross bagging scale with feeder is product of the Richardson Scale Co., Van Houten Ave., Clinton, N. J.)

Check 3815 opposite last page.

Here's customer service in action . . . where an equipment manufacturer worked side-by-side with a chemical company through lab tests, sales development, to production. Result? An economical process for making . . .

Powdered Polyethylene by Spray-cooling

DANA B. BERG, Managing Editor
with **A. J. KOEHNE**
Plant Superintendent
Semet-Solvay Petrochemical Division
Allied Chemical Corporation
Tonawanda, New York

Problem: The Semet-Solvay Petrochemical Division of Allied Chemical Corporation needed a more economical, higher capacity, continuous process for making powdered low-molecular-weight polyethylene. Company had a waiting market for the powdered form because of its faster melting and mixing characteristics — of particular advantage in wax blending, injection molding of polyethylene, paper coating, rubber process lubrication, and ink and paint formulation.

Grinding of pellet polyethylene being produced at company's Tonawanda, N.Y., plant was out of the question. Material's physical properties would not permit it.

Solution: Semet-Solvay took the problem to Buflovak Equipment Division of Blaw-Knox Company, Buffalo. Test runs by Buflovak's customer-service laboratory, based on Semet-Solvay experience with their original plant-constructed apparatus for low-capacity batch atomizing of polyethylene, indicated that molten low-molecular-weight polyethylene could be spray-cooled at high production rates, with improved physical characteristics.

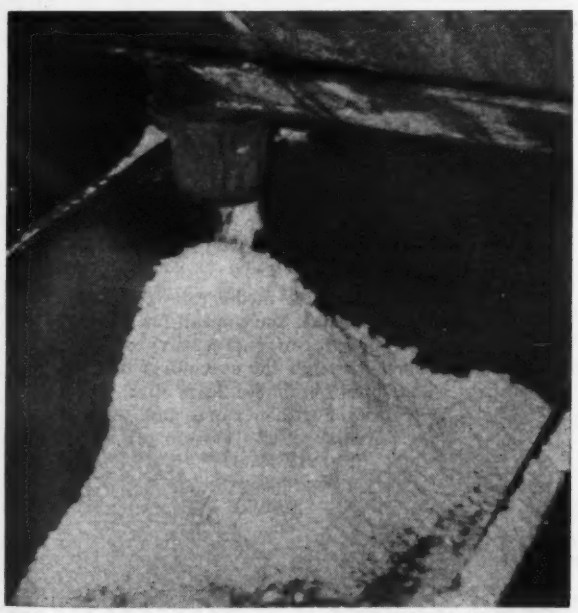
Semet-Solvay authorized the lab to scale-up the tests for product sales evaluation and design data. In fact, Buflovak spray-cooled over 50 tons of the polyethylene to meet the increasing market demands for the product, before Semet-Solvay could get increased production rolling in their plant. While all this was going on, Buflovak was designing and building the spray-cooling equipment for Semet-Solvay's Tonawanda plant.

Production Unit

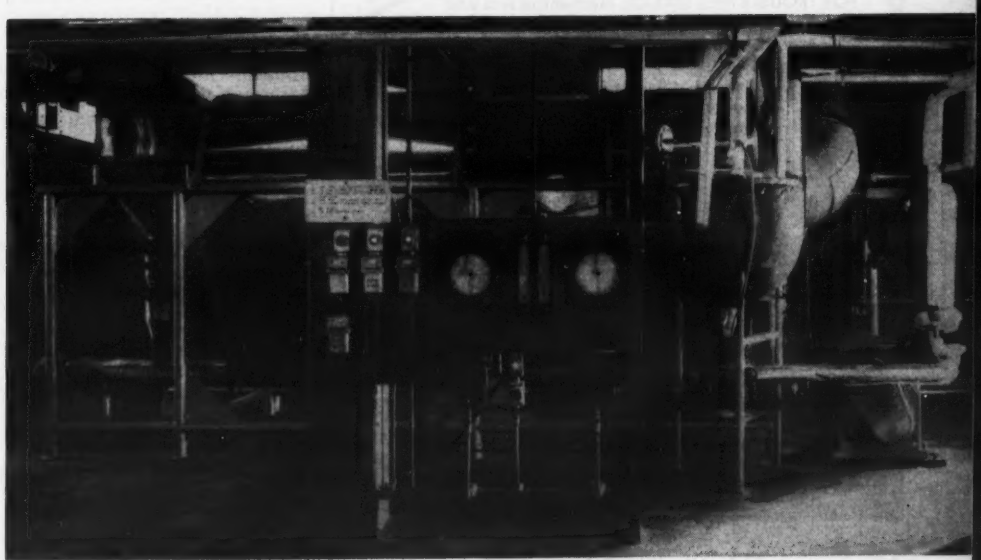
In production, spray-cooling is done in a 6'-diam, 15'-long, horizontal, single-shell chamber of irregular cross-sectional design. Cooler and full-length conveyor screw along its bottom are stainless steel. Capacity is 500 lb/hr.

Molten polyethylene (at 300°F, 0.92 sp gr, 18 cps) is forced through two spray nozzles in end of chamber by a Manton-Gaulin Triplex pump developing a pressure of 2000 psi. Pump was designed with cored cylinder to take 150-psi steam, which keeps cylinder temperature at about 300°F. Pump cylinder and wettable parts are stainless steel.

As molten polyethylene sprays into chamber, it is atomized in a stream of cooling



Powdered polyethylene coming from spray cooler during pre-plant runs at Buflovak's customer-service labs



Compact spray-cooler installation at Semet-Solvay Petrochemical Division plant at Tonawanda, N. Y. Pump at far right forces molten polyethylene into horizontal cooling chamber through two atomizing nozzles. Powdered product leaves chamber via built-in screw conveyor extending full length of chamber and outward to far left

Check 3816 opposite last page

Check 3817 opposite last page

air being pulled from outside the plant and, in turn, through chamber and multi-cyclone 12-tube dust collector at 2000 cfm. Solid powder particles form almost immediately and fall to bottom where built-in screw conveyor takes them out of chamber and to packaging operations. Any material that is airborne in exhaust air stream is trapped in collector and continuously blended with chamber discharge.

Bulk density of the powder is about 27 lb/cu ft; average molecular weight, 2000; melting point, 219-226°F. Typical screen analysis of low-molecular-weight A-C Polyethylene 6A is:

Retained	on	20 mesh	0.1%
"	"	40 "	1.4%
"	"	60 "	18.3%
"	"	100 "	39.2%
Through		100 "	41.0%
			100.00%

Results: Spray-cooling technique has proved economical way of producing controlled powdered polyethylene. New equipment provided 10-fold increase in production capacity with little or no increase in floor space required. Performance of equipment is excellent.

(Horizontal spray-cooler is product of Buflovak Equipment Division, Blaw-Knox Company, PO Box 2041, Buffalo 11, N.Y.)

Check 3818 opposite last page.

(Model 100-HP-KL3-5BAX Triplex pump was made by Manton-Gaulin Mfg. Co., Inc., 44 Garden St., Everett 49, Massachusetts.)

Check 3819 opposite last page.

Minimum maintenance on improved design attrition mills

Uses: Grinding various materials in chemical and allied industries.

Features: Mill's versatility is limited only by size of initial material. Product can be ground fine enough to pass through 250 mesh screen.

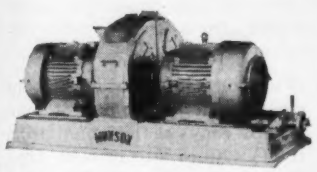
Redesigned unit eliminates

Check 3820 opposite last page

Check 3821 opposite last page

need of convention bearings stands. Motors are furnished with oversize extra-capacity bearings and are designed to permit direct mounting of discs on motor shaft. Bearing maintenance is reduced to minimum.

Description: Ball bearing attrition mills are made for hard and rugged service. Improved design permits overall length of mill to be shortened considerably, thereby adding to its strength and rigidity.



Compact mill is designed for hard, rugged service

Unit is constructed of one-piece gray iron casting. Adjusting end of mill slides out for inspection of interior and change of plates. Slide does not disturb alignment of shaft or bearings.

Bed casting contains integrally cast discharge spout. Design of spout permits free flow of ground material and affords convenient connection to conveying equipment.

Discs and shafts are machined to close tolerances and are precision balanced for vibration-free operation. Seal rings are bolted to the case and encircle neck of grinding discs. Rings are easy to replace.

Adjustments from fine to coarse grinding can be quickly made by use of hand wheel. Changes can be made even while machine is in operation. Grinding plates, or burrs, are made of special composition metal. Plates are ground on face and back and are balanced to assure constant, uniform grinding.

Two types of mills are available; the totally-enclosed, fan-cooled; and the open, general purpose unit.

(Ball bearing attrition mills are product of Munson Mill Machinery Co., Utica, New York.)

Check 3822 opposite last page.

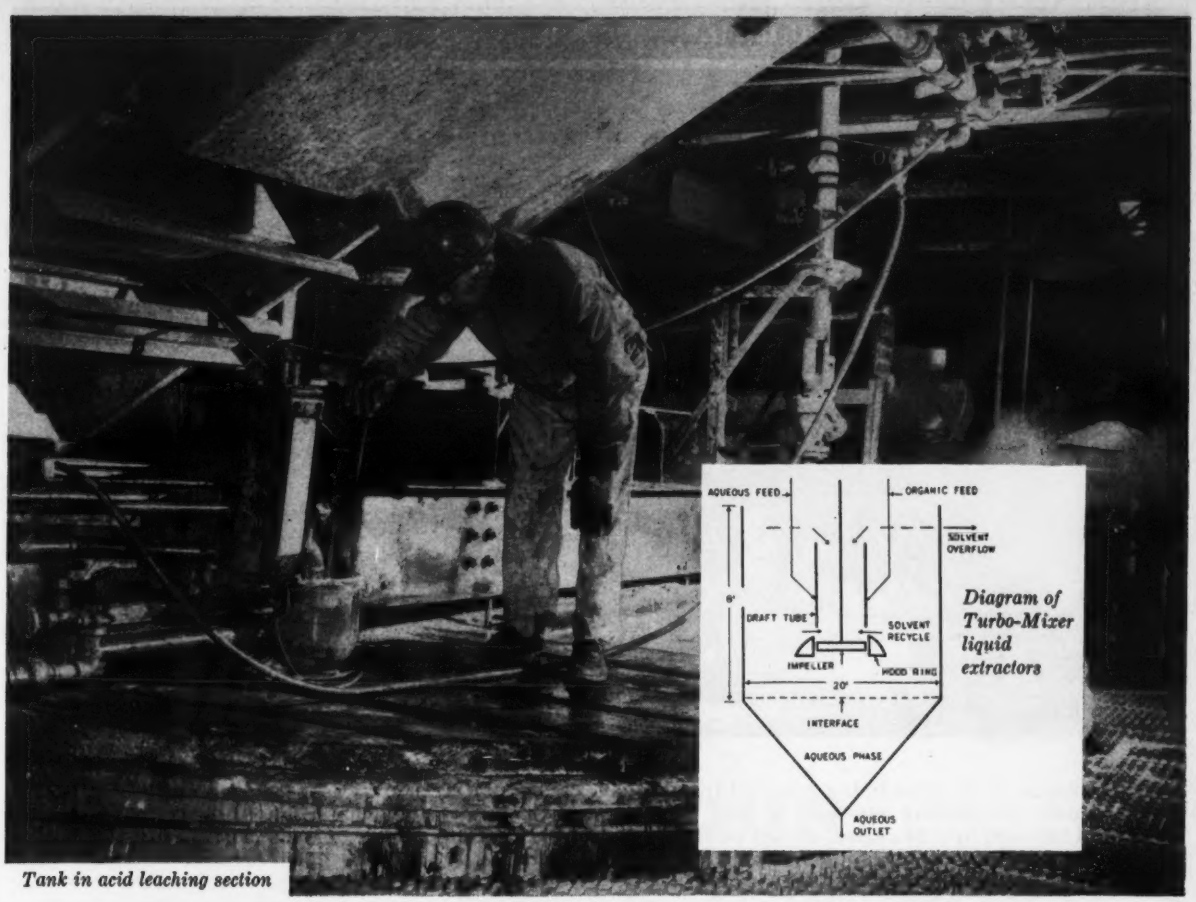


Diagram of Turbo-Mixer liquid extractors

Tank in acid leaching section

VITRO URANIUM HANDLES A WIDE VARIETY OF URANIUM MINERALS WITH TURBO ON THE JOB

When VITRO URANIUM COMPANY of Salt Lake City embarked on a modernization program, they called on GENERAL AMERICAN to assist in the design of the most modern mill possible.

Heart of the plant is the extraction system, and here, GENERAL AMERICAN Turbo-Mixers proved to be key equipment, in both the leaching and liquid extraction sections.

VITRO URANIUM processes a wide variety of uranium minerals which require highly versatile extraction equipment. GENERAL AMERICAN Turbo-Mixers fit this requirement, replacing an outmoded phosphate precipitation operation. Recoveries of uranium fed into the system are "excellent."

As a result of VITRO's million and a half dollar modernization program, the 660 ton/day mill already has significantly reduced operating costs. Further proof that in processing as in transportation and storage, it pays to plan with GENERAL AMERICAN.

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s) :

General Turbo-Mixer Bulletin_____

RDC Extraction Column Bulletin_____

Side Entering Propeller Mixer Bulletin_____

Absorption & Oxidation Bulletins_____

TURBO-MIXER DIVISION
GENERAL AMERICAN TRANSPORTATION CORPORATION

Sales offices: 380 Madison Avenue, New York 17, New York • General Offices: 135 South LaSalle Street, Chicago 90, Illinois • Offices in principal cities

Check 3823 opposite last page.

Booster vacuum pumps handle large volumes in 10μ to 1 mm range

Uses: Producing vacuums.

Features: Pumps are capable of handling large volume pumping loads in 10 microns to 1 millimeter range.

Description: Series of mechanical booster vacuum pumps are available having maximum pumping speeds of 1050, 1250, 2900, and 5100 cfm respectively, and an ultimate vacuum of ½ micron. Larger units, having capacities up to 10,000 cfm are also under development.

(Further information about mechanical booster vacuum pumps may be obtained from the Vacuum Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.)

Check 3825 opposite last page.

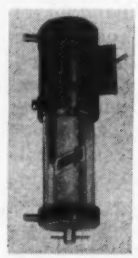
Compact, portable filter has pump magnetically operated by motor

Two models conservatively rated at 100 to 300 gph

Uses: For filtering expensive, sensitive, hazardous, and critical solutions.

Features: Portable filter has pump which is inside motor housing and magnetically driven by motor. Stuffing boxes, rotary seals, shaft wear, coupling, and alignment problems are eliminated, resulting in leak-proof, maintenance-free operation.

Description: Pump parts are fabricated of corrosion-resistant stainless steel. A 316-stainless steel liner isolates motor windings from pumping chamber. Pump is driven by ⅛ hp totally-enclosed 110 v, 60 cy., one phase motor supplied with thermal starting and overload relay.



Model LEI-10 is conservatively rated at 100-150 gph, while rating of Model LEI-20 is 200-300 gph. Pump will de-

liver 1300 gph on open pumping. Pinch valve located after filter chamber throttles high flow. Motor is not affected by throttling; it simply does less work when pumping less liquid.

Each unit is 6½ inches in diameter, 23 and 33 inches (including portable handle) high, and weighs 38 and 45 lb, respectively.

Also available for filtering operations up to 1800 gph are models with ¾ hp motors and multiple unit filter tube chambers containing three, four, six, eight, and 12 filter tubes.

(Portable filters are manufactured by Sethco Manufacturing Co., 2284 Babylon Turnpike, Merrick, N.Y.)

Check 3826 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Holes, 0.003" diam produced mechanically for screen use

Recently developed fabricating process makes possible, by mechanical means, perforation of extremely small holes in many types of sheet metal, including stainless steel and aluminum. Openings as small as 0.003" diam in 0.020"-thick stainless steel on very close and uniformly spaced centers are available. Holes are tapered to minimize blinding.

(Further information about screens may be obtained from Pyramid Screen Corporation, 181 Harvard Street, Brookline 46, Boston, Massachusetts.)

Check 3827 opposite last page.

Plate and sheet metal fabricator's facilities and products are illustrated and described in 16-page bulletin that also discusses services. Facilities and Services Bul—Littleford Bros., Inc., 453 East Pearl St., Cincinnati 2, Ohio.

Check 3828 opposite last page.

Check 3830 opposite last page

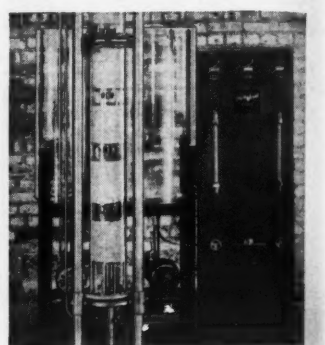
Up to 20 gal per minute processed by low-cost extraction plant

Packaged unit comes with manual or automatic controls

Uses: Conducting solvent extractions in pilot plants are small-scale production.

Features: Extraction plant comes as a completely packaged unit ready for operation within a few hours after arrival. Units have low initial cost and are available in capacities ranging from 20 cc to 20 gallons per minute.

Description: Equipment consists of a gravity-type column equipped with efficient impeller mixing sections. Sections are assembled on a rotating shaft controlled by a variable-speed drive unit.



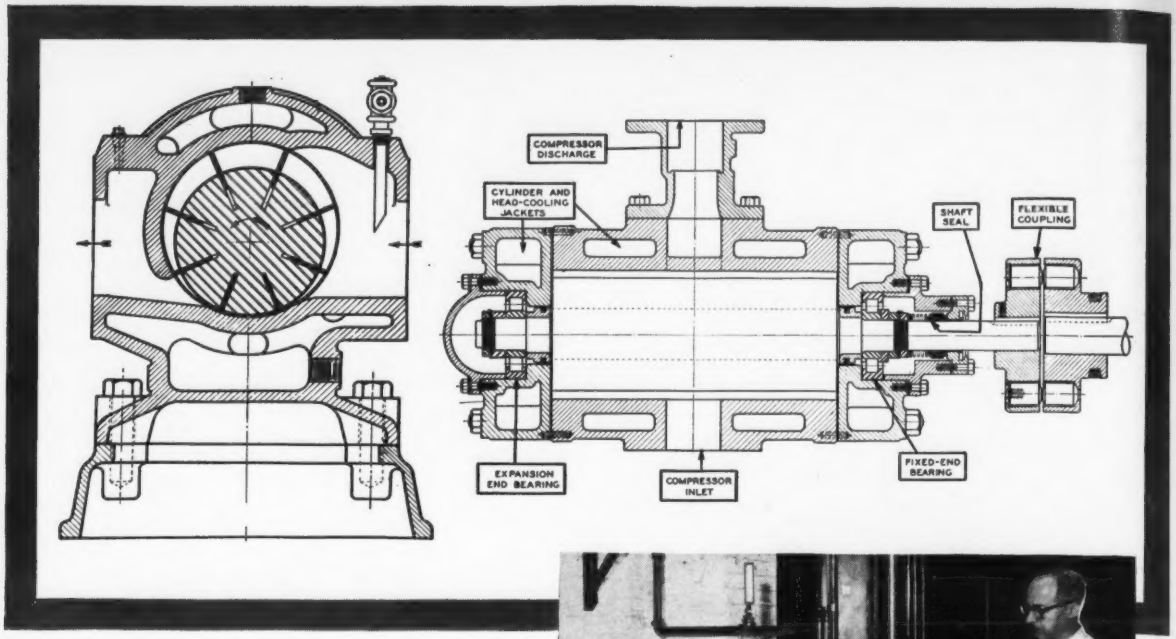
Compact solvent extraction column is flexible, can have up to 10 or more stages

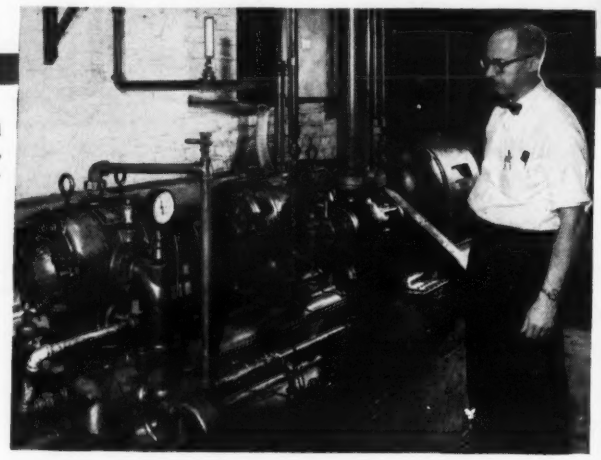
Clarification sections are packed with coalescing materials necessary for phase disengagement. Sufficient mixing and clarifying sections can be combined in a single unit to provide as many as 10 or more stages. Plant can be fitted with either manual or automatic controls.

(Spiradyne column extraction plants are product of Podbielniak, Inc., 341 East Ohio Street, Chicago 11, Illinois.)

Check 3831 opposite last page.

For more information on product at right, specify 3832 . . . see information request blank opposite last page.





Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C. Wilson, Inc., Long Island City, N.Y.

FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME

A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts.

Simple design means trouble-free service. Besides bearings, the only moving parts in a Fuller vane-type rotary compressor are the cylinderical rotor and the blades. These compensate for wear automatically. Cylinder head slips off, permitting blade and bearing inspection in a matter of minutes.

Compact and vibration-free. Direct-drive system saves space. Simple, rugged design gives constant service without extensive supervision. Thus, Fuller rotaries can be installed out-of-the-way—on upper floor, on balconies, in basement corners, using low-cost, light-weight foundations.

1189
C-340

Write today for detailed information on the full line of Fuller rotary compressors for in-plant services, gas gathering, and industrial refrigeration.

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • New York • San Francisco • Seattle

Fuller
... pioneers in harnessing AIR

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Check 3833 opposite last page

Process heat-sensitives, viscous, foamy materials easily with thin-film unit

Short contact time permits use of high temperatures

Uses: Concentrating wide variety of viscous, foamy, or heat-sensitive materials.

Features: Machine's turbulent thin-film action and controlled contact time between product and heating medium, result in high heat transfer rates which are easily regulated to suit requirements of the product.

Description: Equipment consists essentially of a jacketed, vertical vaporization tube discharging into a centrifugal liquor-vapor separator. A spinning rotor in the tube agitates the down-flowing, thin film of liquid into a violent turbulent action.

Rotor blades are fitted to wipe tube wall within small fraction of an inch throughout entire length of rotor.

Because of extremely short contact time between product and heating surface, relatively high-temperatures can be used. Burn-on, and localized encrustation due to overheating, are avoided because every particle of product on heating surface is in constant turbulent motion.

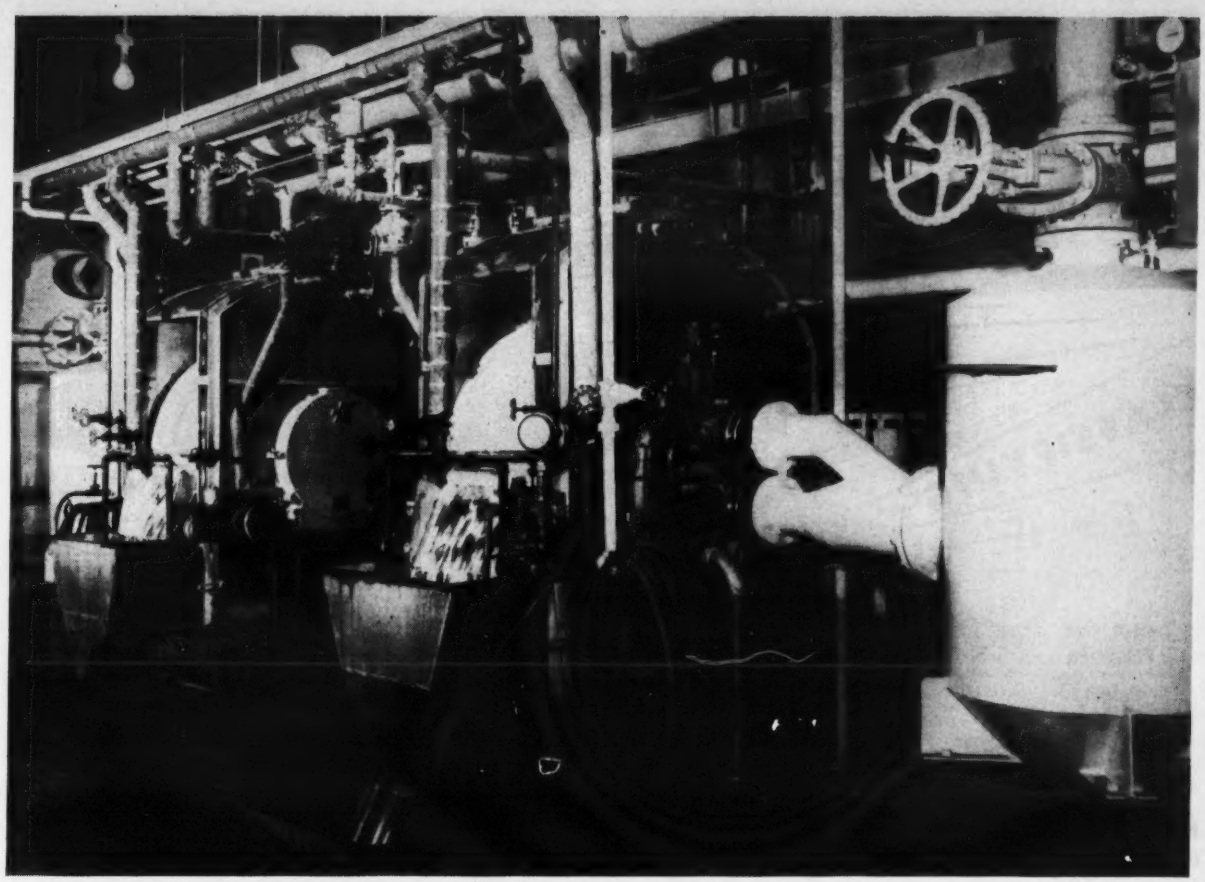
Liquor and vapor pass vertically down vaporization tube. There is no possibility of entrainment re-run, or reflux of product, and subsequent deterioration of properties due to overheating.

Observation glasses, vacuum controls, and a sampler connection provide for efficient control. Quick-opening manholes give easy access to bearings, packing glands, and seals for maintenance.

Units are available in different sizes. Various materials of construction can be used, depending upon product being processed.

(Agitated-film ROTO-VAK evaporators are product of Buflovak Equipment Division, Blaw-Knox Company, P.O. Box 2041, Buffalo 5, New York.)

Check 3834 opposite last page.



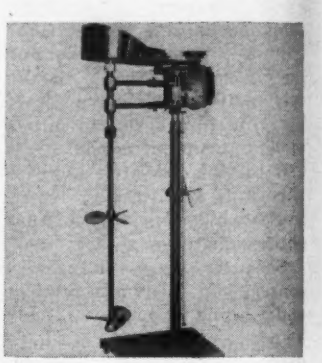
Mobile 3-speed mixer is easily adjustable to various heights

Has belt drive; operates at 175, 325, and 575 rpm

Uses: Mixing slurries and solutions.

Features: Mixer comes equipped with rollers for mobile operation. Both the propeller and stand shafts are adjustable for unlimited settings for "above-and-below" floor level tanks.

Description: Three-speed mobile mixer is fitted with standard belt drive for propeller speeds of 175, 325, and



Mixer is mounted on stand equipped with rollers for mobile operation

575 rpm. All parts coming in contact with materials being processed are made of stainless steel.

Units are available with various size motors and blades. Mixer equipped with ¼ hp motor has 6″ blades, ½ hp with 8″ blades, and the ¾ hp with 10″ blades. Largest blade size is 18″.

(Three-speed mobile mixers are product of Terriss Division, Consolidated Siphon Supply Co., Inc., 22 Wooster Street, New York 13, N.Y.)

Check 3837 opposite last page.

NEXT MONTH

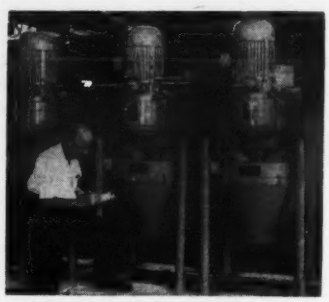
Every chemical engineer is interested in heat exchangers. Pros and cons of falling-film type units in use at Stauffer's hydrocarbon chlorination plant are revealed in March CP.

Up to 10 tons per hr handled by compact impact mill

Uses: Grinding or blending various free-flowing dry materials in pilot plant or small production quantities.

Features: Compact mill is adaptable to either batch or continuous operation. Throughput capacity is about 10 tons per hr.

Description: Centrifugal impact mill has 27" rotor and can be equipped with either constant- or variable-speed drive motors. Mill can be operated at any pre-determined impact velocity up to 25,000 fpm. If necessary, rotors and impactors can be furnished in wide range of corrosion and abrasion-resistant alloys.



Mills have 27" rotor, can be operated at impact velocities up to 25,000 fpm

(Centrifugal impact mill is product of Entoleter Division, Safety Industries, Inc., New Haven, Connecticut.)

Check 3839 opposite last page.

Barrel finishing machine which, according to manufacturer, permits finishing work to be done in a fraction of the time previously necessary, with no damage to parts, is described in illustrated four-page Bul 255 — Metal Finish, Inc., 410 Frelinghuysen Ave., Newark, N. J.

Check 3840 opposite last page.

Electric furnaces for both laboratory and production use are subject of 2-page bulletin. "Electric Furnaces and Ovens" — L & L Manufacturing Co., 136 Eighth Street, Upland, Delaware County, Pennsylvania.

Check 3841 opposite last page.

Check 3843 opposite last page

Bleaching system processes various pulps, efficiently, economically

Uses: Continuous bleaching of pulp produced by either chemical, semi-chemical, or mechanical processes.

Features: System is designed for efficient service under rugged mill conditions. Components used are of both new and proven designs, assuring maximum efficiency with minimum maintenance.

Description: Continuous pulp bleaching systems are designed and engineered for each individual mill. Wide choice of materials of construction provide necessary corrosion resistance where required. Flexibility in design permits ideal location of components at each installation.

Major components are blending chest, chlorination tower, chlorine washer, caustic extraction tower, caustic washer, hypochlorite bleach tower, hypo washer, and bleached stock storage facilities.

Heart of system is vacuum bleach washer, in wide use throughout pulp industry for many years. Stock chest agitators feature adjustable pitch propellers designed for most efficient power use. High-density stock mixers are available with either single or double shafts.

Bleach tower dilution nozzles, mounted in base of high-density down-flow towers, are regulated by single control. High-density storage tower has oscillating design mining nozzles. Spring-loaded check valves automatically prevent pulp backup.

Two-jet oscillating barrel assures complete discharge of stock from tower with minimum mining water. Rotary motion barrel has large bearing surfaces and conventional ring packing.

(Continuous pulp bleaching systems are product of Dorr-Oliver Incorporated, Stamford, Connecticut.)

Check 3844 opposite last page.

Batch processing units, package-type, for experimentation, research, and development are described in four-page folder. — Artisan Metal Products, Inc., 73 Pond St., Waltham, Mass.

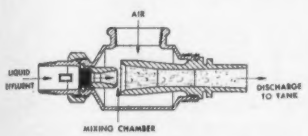
Check 3845 opposite last page.

"Gentlemen: This letter is being typed on our new Tiger Rag Bond paper. Notice how it takes all these erasures with hardly a trace."

Efficient aeration ejectors give higher O_2 absorption, need little power

Uses: Introducing and dispersing air into biological oxidation waste treatment systems.

Features: Units have low initial cost, are simple to install, and can be used in new or existing installations. Ejectors are reported to cut by 95% the high concentration of bacteria cells and provide 20 to 25% oxygen absorption as compared to 4 to 5% absorption obtained by conventional apparatus. Horsepower savings are over 40%.



Aeration ejectors are precision-made, have low initial cost, and need practically no maintenance

Description: Aeration ejectors are available in a wide range of sizes. Units are normally made in all-bronze construction with stainless steel pressure nozzle.

Device consists of a combination of jets forming a venturi section submerged in a tank, ejector must normally be supplied with effluent liquor at pressure of 15 to 20 psi. Air is furnished at pressures slightly in excess of submergence head.

Liquor and air are blended into a homogenous mixture of finely intermingled particles in mixing chamber. Discharged from ejector, mixture sets up strong mixing motion in the tank. Intimate contact between activated sludge floc and the finely divided air particles and organic matter in tank is thereby affected.

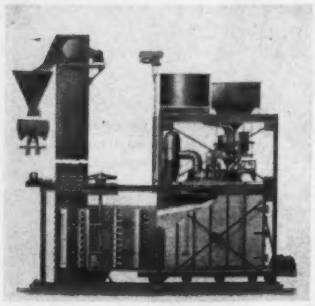
Ejectors operate practically trouble-free, keeping maintenance at a minimum.

(Further information about aeration ejectors may be obtained from Penberthy Manufacturing Company, 1242 Holden Avenue, Detroit 2, Michigan.)

Check 3846 opposite last page.

Den system allows ease of operation in producing 'Super'

Although many fertilizer plants have switched to a continuous process for manufacture of normal run-of-pile fertilizer, International Minerals & Chemicals plant, Chicago Heights, Illinois is using the den and excavator system because of ease of operation



Den and excavator can be operated with three or four men easily

and accuracy possible. IMC finds that three to four men can operate the unit without difficulty.

Den and excavator accumulates the mixture of phosphate rock and sulphuric acid as a honeycombed mass, dissipates excess moisture, and shaves the block of "super" into little slices for storage.

Cycle of operations is approximately two hours for 40 tons size when used to capacity.

(Den and excavator unit is product of Sturtevant Mill Company, Dorchester, Boston 22, Massachusetts.)

Check 3848 opposite last page.

Canned turbine pump featured on leakproof filtration unit

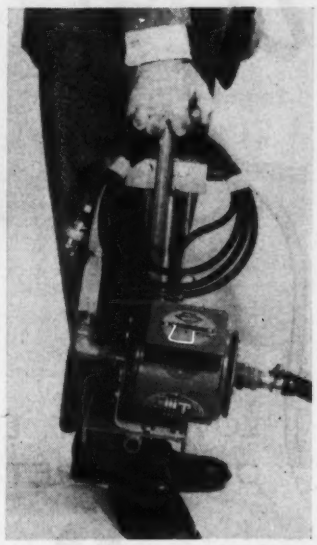
Rotating magnetic field drives pump impeller

Uses: Filtering costly or critical solutions in chemical, pharmaceutical, food, and allied industries.

Features: Compact filtration unit is leakproof, low cost, and portable. Rotating magnetic

field drives pump, eliminating need for any seals or stuffing boxes. Filter cartridge removes particles ranging in size from 150 down to 1 micron.

Description: Filter uses canned turbine pump and motor unit which is continuously lubricated by solution being



Compact filtration unit is leak-proof, has no seals or stuffing boxes

pumped. Conventional lubricants are not required. Pump's flow rate is easily adjusted by simple pinch valves.

Stainless steel filter tube contains element of specially processed cotton or dynel yarn wound around stainless steel supporting core. Numerous interlaced layers result in about 500 sq in of filtering area per cartridge. In precious metals plating solution filtration, precious metals are fully reclaimed by simply igniting the inexpensive cartridge.

Filtration area may be boosted by attachment of additional filter tubes. Single cartridge can handle up to 300 gph. Four-tube filter can process up to 800 gph. On multiple-tube units, individual cartridges may be replaced without stopping filtering operations and holding up production.

(Pre-Met solution filters are product of Sel-Rex Corporation, Nutley, New Jersey.)

Check 3850 opposite last page.

CP **PLANT ENGINEERING MAINTENANCE & SAFETY**
. . . electrical & mechanical developments

How compressors are used in CP industries

Putman survey finds reciprocating type accounts for two-thirds of total

The chemical processing industries use nearly twice as many reciprocating compressors as centrifugals and rotaries combined, according to a recent survey made by the Research Department of Putman Publishing Company, publishers of CHEMICAL PROCESSING magazine.

Basic inorganic and organic chemicals, petrochemicals, petroleum refineries, paper and board, and rubber processing were included among 147 plants polled.

These plants reported a total of 2140 compressors (16 hp and over) in use. Of these, 68% were reciprocating, 17% centrifugal, and 15% rotary.

About a third of the reporting plants installed in 1958, or expect to install in 1959, one or more new compressor units.

From findings of the study, the Putman Research Department estimates that, on the average, new compressors purchased each year by chemical processing plants already in operation amount to about 3.5% of compressors in use. (This figure does not include the hundreds of units purchased each year for newly built plants.)

Largest number of compressors reported used by a single plant was 84. Eight plants reported more than 50 compressors in use in each; 14 reported between 26 and 50 each; 41 between 11 and 25 each; 35 between six and 10 each, and 49 plants between one and five each.

Other findings disclosed in the survey were:

Fifty-three percent of all compressors are used in process service (process gas, process air, vacuum), with the remaining 47% used for plant air, instrument air, refrigeration, conveying, etc.

In process service, hydrocarbons, synthesis gas, propane, ammonia, chlorine, hydrogen, and nitrogen were the gases most frequently reported being compressed.

About a third of all compressors are over 250 hp, and a little under a third are over 125 psig. (These ratios are somewhat higher for reciprocating compressors alone.)

Sixteen percent of all compressors (but 45% of centrifugals alone) operate in three or more stages.

Seventy percent of all compressors (but 93% of rotaries alone) are electric-motor-driven.

Relative Use of Compressors

Product	No. of plants in survey	Avg. No. of compressors per plant
Heavy inorganic chemicals	30	13
Ammonia synthesis	10	23
Synthetic rubber	8	23
Synthetic plastics and resins	11	8
Other organic & inorganic chemicals	52	16
Petroleum refining	13	16
Paper and paperboard	18	9
Rubber	5	7
Total	147	15

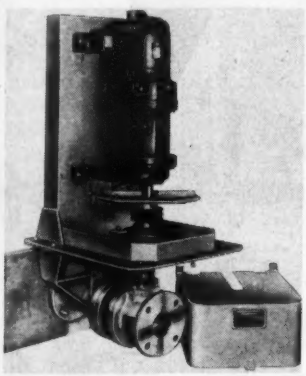
When power fails, valve closes automatically

Valve is open, closed by built-in motor

Uses: For heavy duty liquids service.

Features: Unit closes automatically when power fails. Opening and closing is accomplished by built-in electric motor. Fail-safe mechanism is incorporated that immediately closes valve when power failure occurs.

Description: Heavy-duty liquid valve is designed for remote control operation. Torque-type motor is arranged to operate to a stall in both open and closed positions so



Heavy-duty liquid valve, shown with cover removed, is opened and closed by built-in electric motor

that no limit switches are required. Floating bronze valve ball is hard chrome plated to resist scratching, pitting, and abrasion. Resilient, synthetic rubber seat is wiped clean each time valve is opened or closed.

Full round port area does not change water stream shape as it passes through valve. Valve is manufactured in two standard sizes, for 3" and 4" pipe. Models are available in stainless steel for highly corrosive applications.

(Models MV-1000 and MV-2000 are product of Gemco Inc., P.O. Drawer 3908, Shaker Square Station, Cleveland 20, Ohio.)

Check 3852 opposite last page.

Check 3853 opposite last page

Stainless radiochemical tracer laboratory . . .

. . . formed central part of AEC's three-phase exhibit during the Second United Nations International Conference on Peaceful Uses of Atomic Energy at Geneva, Switzerland in September 1958. AEC personnel used the fully equipped laboratory to demonstrate radioactive labeling of organic compounds and to show results obtained through research with these materials. Laboratory equipment was fabricated largely from stainless steel for easy decontamination.

(Stainless steel laboratory equipment was fabricated by S. Blickman, Inc., Weehawken, New Jersey.)

Check 3855 opposite last page.

Dry chemical systems provide fire protection with remote controls

Uses: For protection from fires caused by flammable liquids and electrical equipment.

Features: Single pull handle at remote hose sites simultaneously opens valve, pressurizes tank, and fills system with fire-killing chemical powder.

Description: Stationary dry chemical hose line systems are offered in 150-, 300-, and 500-lb dry chemical capacity. Systems come in compact "package" designs requiring minimum of floor space. All models carry Underwriters' Laboratories and Factory Mutual approval.

(Stationary dry chemical systems are product of the C-O-TWO systems division, The Fyr-Fyter Co., 221 Crane St., Dayton 3, Ohio.)

Check 3856 opposite last page.

THAT'S INTERESTING

Booze bottle bogey

If you want to separate guest from pest and really finger the elbow-bending freeloader, dispense your choice booze from lethal looking lab decanters. The sot, bending to the task of liberal libation, will get a jolt before instead of after when he focuses on the bottles labeled concentrated nitric, sulfuric, or hydrochloric acid. What alcho, no matter how determined, could ignore the prospect of incurable acid stomach these authentic 8 ounce reagent bottles bode? (Purveyed by Bottle-Nose Jones)

Luminous paint call

The Armed Forces need a self-luminous paint that can easily be seen in the dark for at least five years. It should require no external excitation and emit no harmful radiation.

For more information on product at right, specify 3858 see information request blank opposite last page.

Provides compressed air dried, cooled, cleaned for controls, processes

Uses: With compressed air instruments or controls and for industrial or chemical processes where the presence of moisture from the atmosphere or dirt or lubricating oil is undesirable or damaging.

Features: Unit provides compressed air dried, cooled, and cleaned.

Description: Method uses two air machines in series, an after cooler and compressed air chiller. In the first stage, hot compressed air temperature is reduced to approximately that of the atmosphere by evaporative cooling. An oil separator removes moisture, oil, or dirt that has been condensed from compressed air.

In second stage, air chiller uses refrigeration to cool and further dry air to meet very exacting specifications.

Typical installation produces 45°F air at 90 psi pressure needing only 5 tons refrigeration for 900 cfm free air. Air moisture will be only .065 lb per 1000 cu ft.

(Aero after cooler and compressed air chiller are manufactured by Niagara Blower Co., 405 Lexington Ave., New York, N.Y.)

Check 3859 opposite last page.

Space-age insulation combines light weight with heat resistance

For 1300 to 2100°F range

Uses: Material is suitable for insulating applications where space and weight are critical.

Features: Material combines light weight with excellent resistance to heat. According to manufacturer, in the 1300 to 2100°F range, it is about twice as effective on a volume basis as any known insulating material.

Description: Called fibrous potassium titanate, product is composed of compact mass of crystalline fibers which due to their fineness, give it a talc-like feel. Because of small

diameter (less than 1/25,000 of an inch) and high reflectance of fibers, insulating material blocks heat penetration by scattering incoming infrared rays.

Blocks, which can be formed into any desired shape while wet, show exceptional dimensional stability upon prolonged

In 1300° to 2100°F range, fibrous potassium titanate is said to be twice as effective on volume basis as any known insulating material

exposure to heating. After six days aging at 1900°F, blocks have shown no dimensional change.

Product is easy to fabricate. Available forms include loose fibers, loose fill, blocks of varying densities, mats of various thicknesses, and "lumps". A trowelable material is also available.

(Fibrous potassium titanate is a development of Pigments Department, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware.)

Check 3861 opposite last page.

Air conditioning operating from a central station is described in catalog which lists 29 different types and sizes. Cat 7558 — Young Radiator Company, Racine, Wis.

Check 3862 opposite last page.

Heating problem solutions, and clarification of ordering information are contained in 52-page catalog which also includes new product information. Heating processes also are described. Cat GEC-10051 — General Electric Company, Schenectady 5, N. Y.

Check 3863 opposite last page.

Drum of aluminum chloride ready to lower into position over hopper for dumping

Emptying drums of aluminum chloride was hard, disagreeable job requiring work of two men. But switch to explosion-proof lift truck . . .

Slashed by 50% time required to safely charge catalyst hoppers

Problem: Two operators were required to safely elevate, invert, and discharge drums of granular aluminum chloride catalyst in production of ethylbenzene at Koppers Company's plant in Port Arthur, Texas. It was a hard, disagreeable job to operate hand-powered truck because of roughness of acid-proof brick floor, weight of full drums, and other equipment on vehicle.

Sealed hoppers containing aluminum chloride are located in Class 1, Group D area. Working area is extremely limited so truck had to be unusually maneuverable. In addition, area and truck were subjected to hydrochloric acid vapors and aluminum chloride dust during dumping.

Solution: Hand-powered truck was replaced by specially adapted explosion-proof, highly maneuverable lift truck with dual drive wheels. Vehicle exceeds standards for safety in areas otherwise considered unsafe for mechanical materials handling.

Truck is electrically powered, with electrical system totally, physically and mechanically enclosed. Equipment is designed so that temperature of metal surface will not reach ignition point of the explosive atmosphere.

A feature is disc-type brake which is released hydraulically by a dead-man's foot pedal installed on operator's platform. Hydraulic-mechanical linkage

placed inside main housing cuts out electrical control circuit when pedal is released.

Single dead-man directional lever controls forward and reverse and two speeds in either direction. Lifting and lowering are actuated through a dead-man control mechanically linked to electrical controls inside main housing.

Aluminum chloride is fed into process continuously from hoppers, which are refilled directly from drums through an opening in top. Drums have removable tops and ring-type closures. In filling a hopper, drum lid is replaced with a transition piece which attaches to drum with drum lid closure. Opposite end of transition piece is so sized that it mates with hopper manhead, and a slide gate holds contents while drum is inverted.

With transition piece attached to drum, lift truck elevates, inverts, and positions drum over hopper doors. Slide gate is opened, and contents are dumped into hopper.

An asphaltic-like coating (Koppers' Bitumastic) has been applied to truck to protect it from corrosive vapors.

Results: Time required to charge hoppers has been reduced 50 percent since only one man is needed to do work in safe manner with minimum of effort.

(Series 54.00 Go-Getter trucks are manufactured by Revolvator Co., 8727 Tonnele Ave., North Bergen, N.J.)

Check 3865 opposite last page.

Interrupter switches, unfused and fused, are detailed in 24-page bulletin. Design details, operation, ratings, and applications are included. Bul 1610A — R & I E Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.

Check 3866 opposite last page.

Materials handling safety tips are contained in 16-page pamphlet which tells reader how to pile and lift and gives rules for driving power trucks. Descriptive literature on "Easy Does It" may be obtained from National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Check 3867 opposite last page.

Operating within line pipe line booster pump stops motor damage

Uses: As submersible pipe line booster pump.

Features: Unit operates in horizontal position within pipe line itself. It eliminates motor damage from heat, dust, and moisture.

Description: Design of submersible pipe line booster pump enables pump to be suspended within special section of pipe line. Section is flanged at each end and becomes an integral section of pipe line.

Motor is centered and firmly held by special spiders within this section. Line liquid is drawn past motor and into bowl assembly which passes it along at greatly increased pressure. Submersible power cable leads to terminal box mounted on outside of special section, and from there runs to control box.

Pump is available in sizes designed to operate within pipe from 8 to 24". It will give capacities from 100 to 4000 gpm in heads ranging from 50 to 500 ft.

("Power-line" booster pump is product of Layne & Bowler Pump Co., Vail at Sycamore, Los Angeles 22, Calif.)

Check 3870 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

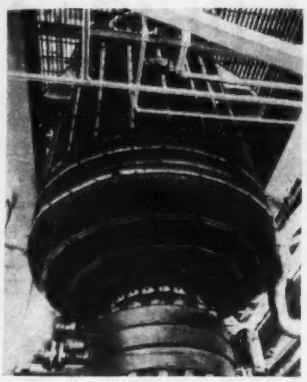
Gives early warning of overheat condition

Uses: As overheat-fire detector.

Features: In addition to giving prompt alarm to dangerous temperature rise, detectors monitor temperature along every inch of strand. Simplicity and flexibility of detection system makes it extremely easy to install and almost maintenance free.

Description: Strips of con-

tinuous overheat system come in variable lengths up to 20' and are coupled together to form longer strands. They are of flexible Inconel tubing which contains two wires imbedded in a ceramic, thermistor core. Tubing is attached to surface of equipment in pat-



Simple, flexible continuous strip detection systems are easy to install and almost maintenance free

terns dictated by degree of overheat coverage desired and shape of equipment.

At normal operating temperatures, the ceramic offers high resistance to flow of current between two conductors. At temperatures above this point, resistance drops rapidly. When predetermined resistance is reached, monitoring control unit causes an alarm to sound. When temperature returns to normal, resistance rises and alarm automatically shuts off.

Continuous strip overheat detectors have an alarm range of from 200-1000°F. Strips can be subjected to temperatures as low as −65°F.

(Continuous strip overheat systems are product of Walter Kidde & Company, Inc., 260 Madison Ave., New York 16, New York.)

Check 3872 opposite last page.

Stainless steel sanitary fittings, valves, tubing, and tube-holder assemblies are illustrated and described in 24-page leaflet — Terriss Division, Consolidated Siphon Supply Co., Inc., 22 Wooster St., New York, N. Y.

Check 3873 opposite last page.

Tops four difficulties when pumping liquid CO_2

Pump does not require lubrication, adjustment

Uses: For pumping of CO_2 from bulk delivery trucks to dockside cylinders or systems.

Features: Because of its design, pump requires no separate lubrication. Also, special operating adjustments are not required. Extended "cool-down" time is eliminated by design feature which reduces amount of heat generated. In field tests of units, no maintenance or service has been required.

Description: Steel block rotary gear pump is available in wide range of sizes for low or high pressure applications.

(Northern Nitralloy liquid CO_2 pump is manufactured by Northern Ordnance Incorporated, Columbia Heights P.O., Minneapolis 21, Minn.)

Check 3876 opposite last page.

Packaged boiler unit steams up 100,000 lb or more per hour

Claimed to cut costs 20%

Uses: For steam generation.

Features: Unit is said to be first of its kind capable of generating steam at capacities up to 100,000 lb or more per hour. According to company, cost of units is approximately 20% less than conventional units of similar capacities.

Description: Line of natural circulation packaged boilers requires no recirculating pumps, simplifying operating and maintenance problems. Practically the entire furnace and boiler envelope is water cooled. A minimum amount of refractory material is required.

Boilers are designed to operate at steam pressures ranging from 250 to 775 lb per sq in. Wide furnace allows adequate burner clearance, contributing to complete combustion throughout range of capacities. Pressure-firing design eliminates need for induced draft fan.

Boilers are designed to burn either oil or gas, or a combination of both fuels. If dual-fuel burner is installed, standby fuel becomes instantly available. This avoids both a boiler outage and a drop in steam pressure when fuels are changed.

("B&W Packaged Boilers, Series 100-OG" are product of the Babcock & Wilcox Co., 161 East 42nd St., New York, New York.)

Check 3877 opposite last page.

Tout rubber compound for good resistance to abrasion, corrosion

Uses: Material designed for use in pressure and vacuum systems handling abrasive or corrosive liquids, slurries, suspensions and solids.

Features: Abrasive and corrosive-resistant rubber pipe has flex life that has surpassed previously installed units.

Description: Special abrasive- and corrosive-resistant rubber compound for expansion joints and pipe installations is available in standard sizes from ½ to 72″ I. D. with either duck and rubber or duck and neoprene integral full-faced flanges or integral "Gen-Lok" ends. Pipe is available in any length up to 50′.

("Tuf-Flex" rubber pipe is development of General Rubber Corporation, 52 Summit St., Tenafly, N.J.)

Check 3878 opposite last page.

High shear strengths at high temperatures adhesives feature

Uses: For rubber-to-metal, plastics-to-metal, metal-to-metal and friction materials bonding.

Features: According to manufacturer, these materials have greater shear strength at high temperatures than any other comparable material. At 600° F, their shear strength is 495 lb/sq in.

Description: Family of three synthetic-rubber, phenolic-

resin-base adhesives are all thermosetting. They differ from each other only in the percentages of solids they contain, providing a choice of viscosities.

The adhesives are resistant to all oils, brake fluids, solvents, and water. They have excellent resiliency and ability to withstand shock. Adhesives are completely cured with any of the following combination of bond-line temperatures and curing time: 325°F for 15 minutes; 350°F for 10 minutes; and 400°F for five minutes.

(Ray-BOND R-81001, 81002, and 81114 are products of Adhesive Dept., Raybestos-Manhattan, Inc., Bridgeport 2, Conn.)

Check 3880 opposite last page.

Space, weight factors prime consideration in control design

Uses: For operation in hazardous locations.

Features: Unit has been designed to be used where space and weight are an important factor in control installations. It is listed by Underwriters Laboratories, Class 1, Group C and D, Class 2, Group E, F, and G, (Nema 7-9A). Visible hermetically sealed mercury switch permits instant knowledge of whether switch circuit is on or off.

Description: Pressure control has external adjustments for setting operating range and a visible calibrated dial. Finished in natural aluminum, dimensions of unit are: Width 7¾", overall height including pressure connection 9⅞", and depth 5". Weight is approximately 8 lb.

Control is available in 21 operating ranges from 0-30" vacuum to 0-1000 psi. External pressure is ½" and internal pressure is ¼" Surface or panel mounting is possible, and either breather or drain is available.

(Pressure control is product of The Mercoid Corp., 4201 Belmont Ave., Chicago 41, Illinois.)

Check 3881 opposite last page.

Protects hands, arms from chemical irritants, eases wash-up

Uses: As protective coating against acids, alkalis, and other chemical irritants.

Features: Material prevents skin discoloration and irritation. It makes after work wash-up easier and faster.

Protective barrier between skin and chemical irritant spreads on like a cream, but acts like a glove that is invisible, strong, and as elastic as the skin itself

Description: Greaseless, stainless cream is applied to hands and arms before contact with chemical irritants. Forming a "protective glove" cream dries quickly after application and lasts a long time.

Cream is available in two formulas, for dry work and for wet work.

(Kerodex 51 and Kerodex 71 are products of Ayerst Laboratories, 22 East 40th St., New York 16, New York.)

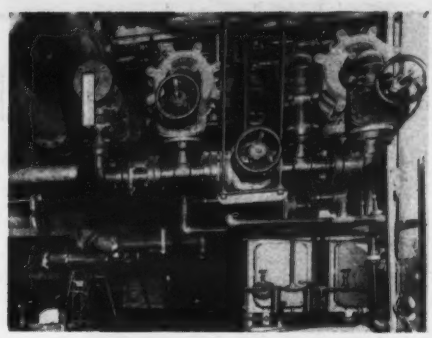
Check 3883 opposite last page.

Uniform cone spray at low pressures

Uses: For discharging large quantities of liquids at low pressures.

Features: Nozzles produce medium to coarse, evenly distributed, solid-cone sprays with normal spray angle of 70°.

Description: Spray nozzles are available in ten orifice sizes to provide wide range of capacities. With water supplied at 10 psig, smallest nozzle will discharge 1.2 gpm and largest 120 gpm. With pres-



Left: Showing the ease of inplant fabrication of Fibercast Pipe and Fittings by plant personnel.

Above: Typical installation of plant fabricated Fibercast assemblies.

Below: Fibercast Pipe drilled and tapped for special application.

easily handles extremely hot, corrosive solutions

Months of laboratory and test-track punishment have proved — the hard way — that Tyrex viscose cord now gives tire makers what they need to produce the toughest, most rugged and long-wearing tires. In the production of this revolutionary new Tyrex cord, a leading producer had to transport corrosive liquids at extremely high temperatures, so hot that the pipe had to be insulated. Solving this problem was Fibercast pipe and fittings made from thermosetting reinforced epoxy resins. They found Fibercast met all the rigid job specifications and enabled quality production at top rates.

Check these features of Fibercast's Piping-Tubing-Fittings and see what they can do to help speed up your processes where corrosion and/or high temperatures present production problems:

- Operating temperature — 65° to 300° F . . . widest range of any high-strength, non-metallic pipe.
- Operating pressures to 1000 p.s.i.
- Radius of curvature approximately 10°.
- Linear coefficient of thermal expansion 7.06×10^{-6} to 8.25×10^{-6} in./in./° F essentially the same as steel.
- Readily handles hot acids, alkali, caustics, etc.
- No electrolytic action. A non-conductor . . . accepted by the electrical industry as a superior insulator.
- Support spans — nominal 18'.
- Light weight and high strength . . . less than ¼ the weight of steel.
- Low coefficient of heat transfer — 3.0×10^{-4} Cal/CM²/sec/CM/° C — saves heat and cold losses in processing.
- Out of 338 common corrosive solutions Fibercast handles 320 — service life of Fibercast generally exceeds that of more expensive piping.
- 3 major systems of joining — standard flanged — cemented — threaded and coupled with complete line of fittings.
- Smooth interior with a Hazen-Williams C Factor-147.

Remember, no other non-metallic pipe has all the desired advantages found in Fibercast. Its unique and exclusive construction, using high quality materials, is processed under rigid controls. This combination results in a high-strength, high-temperature, non-corrosive pipe unequaled in any application.

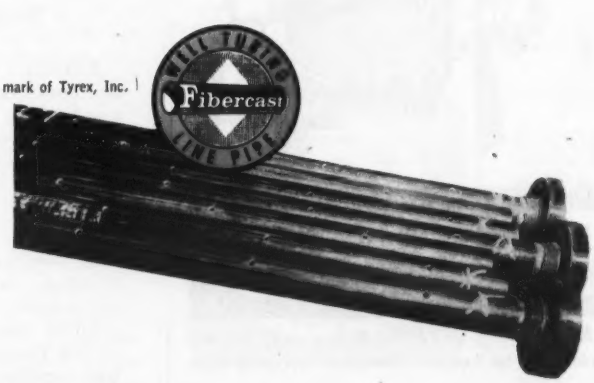
* TYREX viscose tire cord is the newest cord developed for tires, and represents a major scientific break-through. TYREX is a certification mark of Tyrex, Inc.

FIBERCAST COMPANY

A Division of The Youngstown Sheet and Tube Company

Box 727, Sand Springs (Tulsa), Oklahoma

Phone Circle 5-1301 TWX — Sand Springs 480



Check 3884 opposite last page

sure increased to 100 psig, the discharge rates are 3.75 and 375 gpm, respectively. At the other extreme of the pressure scale, the nozzles will produce solid-cone sprays with uniform distribution at pressures as low as 3 psig.

(Spray nozzles are product of Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.)

Check 3885 opposite last page.

Pump heavy, fine slurries with low-speed vertical unit

Uses: For submerged operation in wet pit sump service.

Features: Low-speed unit operates with continuous duty on both heavy and fine slurries. Since only four bolts clamp liquid end of the pump, it can be quickly dismantled. There is no stuffing box or vapor binding.

Description: Vertical heavy-duty slurry pump is available in 9 models varying from 2 to 8" in size. All wearing parts are interchangeable with manufacturer's horizontal pump unit. Bearings are water lubricated (grease is optional).

(Type RXV slurry pump is product of Morris Machine Works, Baldwinsville, N.Y.)

Check 3886 opposite last page.

Resists liquid fuels permits lubrication of pumps, bearings

A new type of grease highly resistant to most fuels and solvents has been developed. It is said to be impervious to the washing action of a wide range of petroleum, coal tars and chlorinated liquids. According to manufacturer, grease permits normal lubrication of pumps, bearings, and sliding surfaces that must operate in the presence of solvents and liquid fuels.

(Grease is development of Pennsylvania Refining Co., 2686 Lisbon Rd., Cleveland 4, Ohio.)

Check 3887 opposite last page.

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Chemical Reaction Engineering

Reviewed by
D. S. DAVIS
University of Alabama

"Chemical Reaction Engineering," a 200-page book, is a collection of papers presented in May 1957 at Amsterdam. It represents the first European symposium on chemical engineering. Three introductory papers are followed by three on transport phenomena in heterogeneous reactions, three on non-uniform concentration distributions, three on reactor efficiency and stability, and two on reactor development.

One paper is in French, four are in German, and nine are in English. All bear summaries in the three languages. Opening and closing addresses for the symposium are included.

This highly mathematical book, edited by Dr. K. Rietema, secretary of the European Federation of Chemical Engineers, contains clear line cuts and is printed in double-column form.

To obtain "Chemical Reaction Engineering" remit $12.50 direct to Pergamon Press, Inc., 122 East 55th Street, New York 22, New York.

Check 3889 opposite last page.

Nomography

Although there are numerous books on how to construct nomographs (or nomograms, as some prefer to call them), not too much published material on underlying theory exists.

This 134-page book by L. Ivan Epstein of Lowell Technological Institute approaches the subject from a purely theoretical standpoint. However, in his discussions, the author has combined methods of construction clearly and concisely with the theorems. Only a few problems have been included.

An attempt has been made to make the presentation mathematically rigorous. However, only two chapters call for a knowledge of differential and integral calculus. The reader should have knowledge of elements of analytical geometry to tackle the book at all.

Drawing from quite a few foreign references, the author does present some material heretofore unpublished in book form.

Subjects covered include: determinants, types of nomographs, projective and non-projective transformations, matrix multiplication, empirical nomography, and Kellogg's method.

To obtain "Nomography", remit $4.50 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y.

Check 3890 opposite last page.

Plant Design & Economics for Chemical Engineers

Reviewed by
DR. JAMES H. GARY
University of Alabama

In "Plant Design and Economics for Chemical Engineers," author Max S. Peters emphasizes the cost side of plant equipment design by devoting the first half to the principles of applied economics. Such topics as operating costs, interest, investment costs, taxes, insurance, depreciation, alternative investments, and replacements are covered in detail sufficient to give background for evaluating costs of alternative equipment design and to aid in selecting the most desirable type.

A number of problems are included at the end of each

chapter dealing with these subjects. Examples also are used throughout the text to illustrate applications of economic principles. Last half of book treats equipment design methods, cost estimation, and design report preparation.

Such aspects of plant design as plant location, plant layout, selection of continuous or batch process, instrumentation, structural design, and waste disposal are rather inadequately covered in a few sentences or paragraphs.

This 511-page volume is a valuable reference on application of economic principles to chemical engineering equipment design.

To obtain "Plant Design and Economics for Chemical Engineers" remit $11.00 *direct to McGraw-Hill Book Company,* 330 *West* 42*nd Street, New York* 36, *N. Y.*

Salary Administration and Intangible Rewards for Engineers & Scientists

This book is actually two books in one. Its 189 pages contain the first two of a series of reports made on a study to determine the vocational needs, goals, and job satisfactions of engineers and scientists. Written by John W. Riegel, professor of industrial relations, University of Michigan, it cites results obtained from interviews with more than 400 persons.

First section of book is devoted to administration of salaries. Consisting of 105 pages, this portion discusses salary structures, salary adjustments, importance as motivating factor, etc. Second part of book contains 84 pages dealing with intangible rewards, such as professional recognition, privileges, freedom of action, opportunities to learn, etc. Each section is divided into four chapters. There is a handy index at end of each section.

The study was conducted by the University of Michigan's Bureau of Industrial Relations in 10 well-established firms. Persons interviewed included

RECENT BOOKS

44 engineering and research executives, 91 supervisors, and 276 non-supervisory engineers and scientists.

Interviews were conducted on an anonymous basis. However, actual quotations from interviewees appear throughout the book. Written in an easy-to-read style, the work includes charts and tables, and is guaranteed to make interesting and informative reading for technical and non-technical men alike.

To obtain "Administration of Salaries and Intangible Rewards for Engineers and Scientists" remit $6.00 *direct to Publications Distribution Service, the University of Michigan, Ann Arbor, Mich.*

Check 3894 opposite last page.

The Chemical Behavior of Zirconium

A broad and detailed account of the chemistry of zirconium as an element and as a component of compounds, interstitial solutions, and alloys is contained in a 398-page book written by Warren B. Blumenthal. The author is chief of chemical research, Titanium Alloy Manufacturing Division of National Lead Company, Niagara Falls, N. Y.

In addition to broad coverage of the subject as related to an element and a component, Mr. Blumenthal also lays down basic rules he has formulated that govern their properties. It is not the author's intention to imply that these rules are final. Instead, one feels their existence is a challenge to criticism and refinement in their formulation.

Mr. Blumenthal uses descriptions of the preparation and properties of zirconium-containing substances, their uses, and measured and deduced details of their structure and the nature of their chemical bonding.

To obtain "The Chemical Behavior of Zirconium," remit $11 *direct to D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J.*

Check 3895 opposite last page.

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Filter bibliography (with index) of over 230 reported applications, printed abstracts of significant bibliographic references, specific recommended procedures in major fields, and booklets and visual aids for training uses are contained in company publication. Filter bibliography — Millipore Filter Corporation, Watertown 72, Mass.

Check 3896 opposite last page.

Chemical index of eight pages contains complete list of products offered by this company. Twelve chemicals are new in this fourth edition and 20 other changes have been made. "Reilly Chemical Index"—Reilly Tar & Chemical Corporation, Merchants Bank Building, Indianapolis 4, Ind.

Check 3897 opposite last page.

Pipe insulation of lightweight glass fiber for temperatures ranging from sub-freezing to 350°F is detailed in eight-page folder. Physical properties, thermal conductivity, guide to specifications for application and finishing, and dimensions are provided in Form WPN-2 — L. O. F. Glass Fibers Company, 1810 Madison Ave., Toledo 1, Ohio.

Check 3898 opposite last page.

Thermocouple assemblies, custom-built for individual applications, are described in engineering data bulletin. These long, multi-thermocouple assemblies are suggested for use in deep vessels, reactors, catalyst beds, furnaces. Details and application advantages are given in the 12-page Bul EDS-47 — Thermo Electric Co., Inc., Saddle Brook, N. J.

Check 3899 opposite last page.

Chemical processing equipment, including filters, demineralizers, heat exchangers, pumps, and waste treatment systems are described in 6-page bulletin. Characteristics and suggested applications for individual units are listed. Bul GEN-58 — Industrial Filter & Pump Mfg. Co., 5912 Ogden Avenue, Cicero 50, Illinois.

Check 3900 opposite last page.

Material handling case history of how one of the world's three largest liquor wholesalers increased speed of material handling operation in its warehouse by 75% is presented in six-page case history Bul 509-1 — Lewis-Shepard Products, Inc., Dept R8-19, 125 Walnut St., Watertown, Massachusetts.

Check 3901 opposite last page.

Thermometers, heavy-duty bimetal type, are detailed in catalog that provides complete information on features, ranges, etc. Cat 09-100 — Weston Instruments, Division of Daystrom, Inc., Newark 12, New Jersey.

Check 3731 opposite last page.

Aluminum rigid conduit—its mechanical and electrical advantages —is outlined in 12-page, four-color descriptive brochure. Form 17-10283—Aluminum Company of America, 749 Alcoa Bldg., Pittsburgh 19, Pa.

Check 3902 opposite last page.

Vinyl processors have another tool for enhancing salability of products in new concentrated synthetic pearl paste which lends conventional high lustre lead type color widely used in industry. Tech. Bul 47P — Claremont Pigment Dispersion Corporation, 39 Powerhouse Rd., Roslyn Heights, Long Island, N.Y.

Check 3903 opposite last page.

Pump and motor units for hydraulic, pressure feed, transfer work with .3 to 55 gpm at rated maximum pressure are described in eight-page illustrated bulletin. Performance, dimensions, and application data are provided in Bul 31 — Roper Hydraulics, Inc., 340 Blackhawk Park Ave., Rockford, Illinois.

Check 3904 opposite last page.

Copper hydrate complex technical bulletin of four pages describes product and lists formula, specifications, precautions, suggested uses, and physical properties. Tech Bul CHC-1 — Henry Bower Chemical Manufacturing Co., Gray's Ferry Road and 29th St., Philadelphia 46, Pa.

Check 3905 opposite last page.

Non-skid veneer designed to eliminate slipping on stairs, catwalks, ramps, and other areas is described in two-page data sheet. X-L Veneer data sheet — Dept. E. I. B., The Monroe Company, Inc., 10703 Quebec Ave., Cleveland 6, Ohio.

Check 3906 opposite last page.

Production savings, by multistage centrifugal blowers and exhausters are explained in manufacturer's Booklet AB-104 — Dept. C-1, Air Appliance Div., U.S. Hoffman Machinery Corporation, 103 Fourth Ave., New York 3, N. Y.

Check 3698 opposite last page.

Inert gas producing equipment (packaged) is described in four-page brochure. Included are inert gas, nitrogen, and carbon dioxide generators, carbon dioxide removal units, gas purifiers, gas drying equipment, and compressors, and storage systems. Inert gas producing equipment brochure — Southwest Industries, Inc., PO Box 19392, Houston 24, Texas.

Check 3907 opposite last page.

Bypass rotameters for measuring fluid rate of flow in pipelines 2" and larger are shown in 2-color, 4-page bul. Directions are given for selecting proper size bypass rotameter, including use of a permanent pressure loss chart. Bul 18B —Dept. M-I, Schutte & Koerting Co., Cornwell Heights, Bucks County, Pa.

Check 3908 opposite last page.

Metallic filter cloth of various meshes, sizes and shapes is illustrated and briefly described in four-page Bul 81 — Cambridge Wire Cloth Company, Cambridge, Maryland.

Check 3909 opposite last page.

Plasticizers-comonomers reference book presents, in a general way, physical and chemical properties of these materials. Individual technical data pages of 46-page book provide specifications for 26 plasticizers and seven comonomers. Other sections are devoted to performance data, application recommendations, and description of test methods. Spiral-bound volume is covered with clear plastic jacket, a product of company. Plasticizers-Comonomers Book — Rubber Corp. of America, Hicksville, N.Y.

Check 3910 opposite last page.

Anionic surface-actives, their properties and uses, are presented in 16-page booklet that also describes chemical derivation and gives formula. "Igepon Surfactants" — Antara Chemicals Division of General Aniline & Film Corporation, 435 Hudson St., New York 14, New York.

Check 3911 opposite last page.

Electronic digital computer's use in creating heat exchanger designs for a specific company is described in four-page application report. Typical data load sheet for programming input data of sample problem is illustrated. LGP Application Report No. 10 — Royal McBee Corporation, Port Chester, N. Y.

Check 3912 opposite last page.

How purifier removes valuable materials entrained in hot gas or air streams without loss of heat is described in four-page bulletin that features cutaway views of method used by purifier in reclaiming materials. Several different applications for equipment are detailed. Simple and economical means of removing 99.9% of solids from air pollutants is outlined in Bul 600 — Centrifix Corporation, 3608 Payne Ave., Cleveland 14, Ohio.

Check 3913 opposite last page.

Environmental chambers — thoroughly discussed and illustrated in 28-page bul. Technical information includes tables and charts of specific heats, metal shrinkage, convection fluids, temperature conversions, and standard atmospheric properties. Controlled atmospheric conditions — Webber Manufacturing Co., Inc., PO Box 217, Indianapolis 6, Ind.

Check 3914 opposite last page.

For handling non-abrasive, non-corrosive materials manufacturer claims its versatile medium is feeder, elevator, and conveyor combined in one unit. Information on space and cost savings may be obtained in Book 2475 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3712 opposite last page.

Activated charcoal is the subject of recently published eight-page pocket-size pamphlet which tells in layman's language the manufacturing processes involved in making product and how it has developed for liquid and gas purification uses. "The Activated Charcoal Story" — Barnebey-Cheney Company, Columbus 19, Ohio.

Check 3915 opposite last page.

Conveyor elevator is subject of four-page bulletin which shows sanitary construction features and illustrates various types of buckets, pulleys, etc. Models, dimensions, and capacities are included. Conveyor elevator bul — The Bucket Elevator Co., 360 Springfield Ave., Summit, N. J.

Check 3916 opposite last page.

Fire information and advice are given in 16-page accordion-fold leaflet. Theme is safety procedures to follow in preventing fires. "Don't Be Alarmed" — National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.

Check 3917 opposite last page.

Check 3918 opposite last page

NEW LITERATURE

Roller chains and sprockets are thoroughly covered in comprehensive 154-page book of detailed engineering data illustrating roller chains, versatility and wide range of applications. Typical installation conditions, formulas, charts, and diagrams that simplify selection of proper chains for any application are provided. Table lists degree of resistance of stainless and bronze roller chains to almost 400 corrosive agents. Book 2657 — Dept. PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3919 opposite last page.

Wire cloth products and services are presented in 94-page catalog that describes nine basic weaves that can be made from any metal or alloy, including titanium. Wire cloth cat — Dept. F, The Cambridge Wire Cloth Co., Cambridge 2, Maryland.

Check 3830 opposite last page.

Drum dryers are described in 28-page bulletin that explains mechanical details of both atmospheric and vacuum dryers equipped with either single or double drums. Typical industrial applications are illustrated and tables of specifications and dimensions are included. Bul 384 — Buflovak Equipment Division, Blaw-Knox Company, 1543 Fillmore Ave., Buffalo 11, New York.

Check 3920 opposite last page.

Magnetic equipment for protection against tramp iron is summarized in company bulletin which also provides information on heavy-duty equipment for purification and concentration of magnetically responsive materials. Magnetic equipment bul — Stearns Magnetic Products, Division of The Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

Check 3921 opposite last page.

How non-aqueous titrations can be performed with speed, simplicity, and much less equipment is explained in eight-page data sheet. Includes extensive bibliography. Data Sheet pH-83-MI — Beckman /Scientific & Process Instruments Division, 2500 Fullerton Road, Fullerton, Calif.

Check 3922 opposite last page.

Cobalt-60 23,000-curie facility is subject of 101-page report on its design and use. Report includes complete description of hot cell, design and assembly of source, dosimetry methods, and mathematical design of cylindrical sources. To obtain PB 131619, "Design and Use of a 23,000 Curie Cobalt-60 Facility", remit $2.50 direct to the Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

Check 3923 opposite last page

Check 3924 opposite last page

NEW LITERATURE

Resistance thermometers for temperatures up to 1000°F are fully illustrated in 36-page catalog. A convenient, tabular listing of specifications by application and design is given. A special section describes precision instruments for laboratory work. Cat EN-S4 — Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Check 3925 opposite last page.

Maintenance man's a minute man with battery-driven fork truck according to brace of bulletins offered by battery manufacturer. Step-by-step photos and instructions show recommended sequence for carrying out battery maintenance. Buls 5996 and 6207 — Exide Industrial Div., The Electric Storage Battery Co., PO Box 8109, Philadelphia, Pa.

Check 3926 opposite last page.

Safe solvent use in "cold cleaning" of metal parts is detailed in four-page report. New concept of a relative safety index for solvent evaluation, based on maximum allowable concentration, vapor pressure, and evaporation rate, is established. "Perclene® Perchlorethylene" — Chlorine Products Section, Electrochemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware.

Check 3927 opposite last page.

Rotary drum filter used for continuous operation in the process industries is detailed in 20-page bulletin. Some 50 photographs and drawings of five types of units are shown, along with operational data. Bul 7200 — Dorr-Oliver Incorporated, Stamford, Conn.

Check 3928 opposite last page.

Wire and powder sprayed coatings of metals and ceramics are discussed in basic engineering data bulletin of eight pages. Bul 136A —Metallizing Engineering Co., Inc., 1101 Prospect Ave., Westbury, Long Island, N. Y.

Check 3929 opposite last page.

Liquid-gas separation units for removal of entrained liquids and solids from air, gas, and steam systems are covered in Bul 142 — Selas Corporation of America, Dresher, Pa.

Check 3788 opposite last page.

Thermometers of acid-resistant 304 stainless steel, in five easily read dial sizes and 12 Fahrenheit or Centigrade ranges, are fully illustrated in eight-page Bul 13E— W. C. Dillon & Co., Inc., 14620 Keswick St., Van Nuys, Calif.

Check 3930 opposite last page.

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to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at left, specify 3932 see information request blank opposite last page.

NEW LITERATURE

Industrial water importance to our national well-being is discussed in 26-page publication of lecture presented at 1957 Annual Meeting of American Society for Testing Materials. To obtain "Your Most Important Raw Material", remit $1.25 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Filters that provide microclarity for all types of industrial fluids, compressed air, CO_2, and other gases are covered in company catalog that also describes engineering facilities. Filter Cat — Dept. CP, Commercial Filters Corporation, Melrose 76, Mass.

Check 3868 opposite last page.

Storage structure and related material handling equipment are described in eight-page illustrated booklet that provides dimensional and capacity data. In addition, basic information on negative and positive pneumatic systems, rotary valves, bucket elevators, feeders, and other equipment is provided. Bul 207 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 3933 opposite last page.

Photometry attachments — are described in six-page brochure. Accessories for flame photometry, diffuse reflectance, paper strip chromatography and test tube analyses plus application information are described. Bul 737 — Scientific and Process Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, California.

Check 3934 opposite last page.

Vinyl-acrylic emulsion, supplementing present line of polyvinyl acetate emulsions, is discussed in four-page bulletin which points out that compound's very fine particle size readily lends itself as a vehicle for water-based paints. Bul NP-30 — Plastics Div., Celanese Corporation of America, 744 Broad St., Newark 2, N. J.

Check 3935 opposite last page.

Mixing and process equipment is detailed in 12-page bulletin that describes and illustrates various units. Dimensions and specifications of mixers and chemical blenders are provided. Bul 83— International Engineering, Inc., 1200 Bolander Ave., Dayton 1, Ohio.

Check 3936 opposite last page.

Corrosion-resistant valves of cast Monel and nickel have respective areas of application described in Bul 9 — Alloy Steel Products Co., Inc., Linden, N. J.

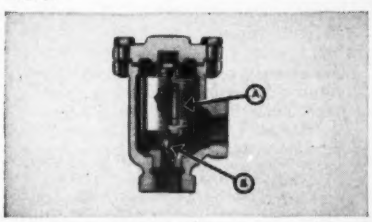
Check 3937 opposite last page.

Full-range steam traps cut high cost of steam pressure variations

By John W. Ritter, Test Engineer
SARCO Company, Inc.

While boiler room economics dictate that boiler pressures remain constant, the equally sound economics of batch processing may decree that pressures at the equipment vary with the requirement of the process. The attempt to choose a steam trap that is all things to all conditions may result in installing traps that operate inefficiently at either extreme of their pressure range or that require adjustment every time the operations sheet calls for another pressure-temperature setting. Orifice traps represent a somewhat more rational approach to the problem, but often at the price of a continuous discharge of steam, particularly at the low pressures of start-up and shut down. Compromise, adjustment, and steam waste all spell inefficiency in the utilization of steam.

Production-Planned steam trapping, on the other hand, improves efficiency by the use of properly designed and installed thermostatic steam traps. Such traps employ the expansion and contraction of a thermostatic element to operate the discharge valve.

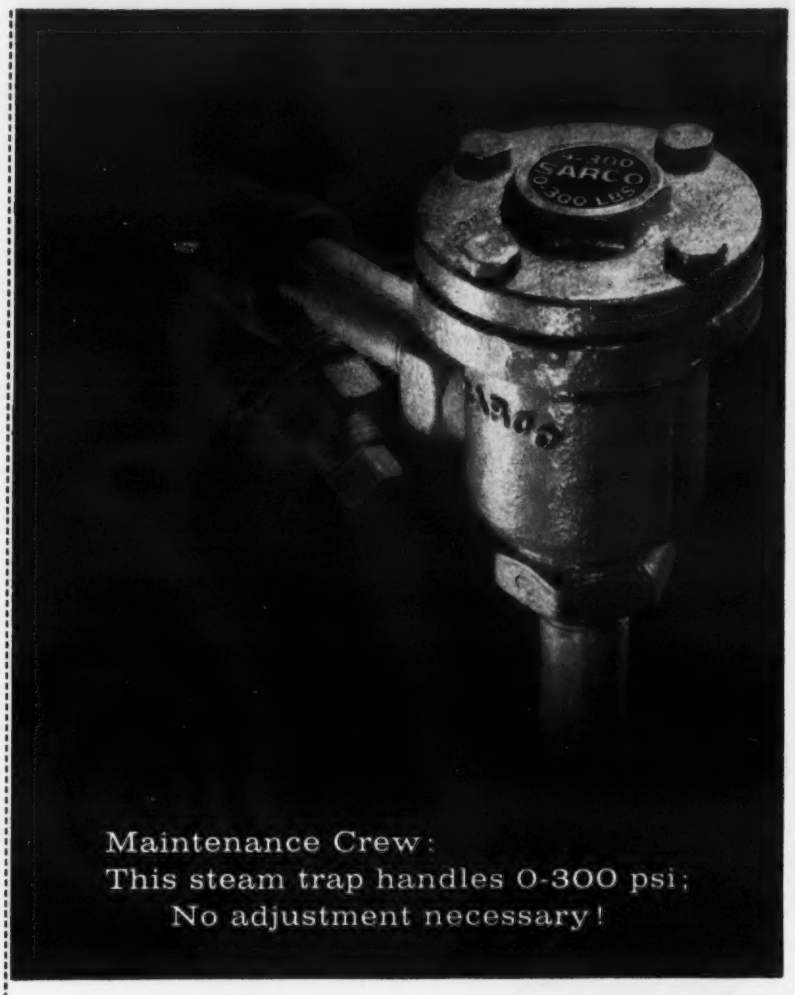


In Sarco Thermostatic Steam Trap, element (A) expands at steam temperature to close valve (B), contracts to permit discharge of condensate.

In the Sarco "Balanced Pressure" Thermostatic Steam Trap a volatile fluid is sealed inside a metal bellows that opens or closes the valve as it contracts or expands with condensate temperature. Near steam temperature, evaporation of the fluid creates an internal pressure greater than steam pressure in the trap body, and the expanding bellows seats the valve. When the condensate cools, the element contracts and opens the valve.

It is evident that at steam temperature pressure inside the element is higher than steam pressure, no matter how the latter may vary. Thus, the trap compensates automatically for variations in pressure.

58108



Sarco "Balanced Pressure" Thermostatic Steam Traps cut trap maintenance costs and simplify parts inventory. Why? Because the same bellows, head and seat handle steam pressures up to 300 psi — without any need of adjustment for variations in load or pressure.

Other advantages: unmatched capacity/cost ratio (1" size discharges 9,650 lbs/hr. at 10°F below steam temperature, 125 psi). This trap can't air-bind and, when installed with free discharge, can't freeze.

Long life and reliable performance are assured by an exclusive Sarco process for fabricating the one moving part — the thermostat — and by steam-testing of every single trap at maximum rated pressure.

Write for "Literature Kit 1A" today. And remember, Sarco can give you impartial advice on *Production-Planned* steam trapping because . . .

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Only Sarco makes all 5 types:
Thermostatic • Liquid Expansion • Float Thermostatic
Thermo-Dynamic • Bucket

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

Check 3938 opposite last page

NEW LITERATURE

Silicone antifoams for use in industry are discussed in brochure. Physical and chemical properties and applications are also found in "Hodag Silicone Antifoams" — Hodag Chemical Corp., 7247 N. Central Park, Chicago 45, Ill.

Check 3940 opposite last page.

Electronic tractor, that does not need operator is discussed in four-page bulletin which describes how it works and lists several economical features. Various applications of equipment are illustrated in Bul 586 — Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill.

Check 3941 opposite last page.

Inert gas generator that is compact in size and said to be highly efficient and very economical is described and illustrated in Bul 114 — Thermal Research & Engineering Corp., Conshohocken, Pennsylvania.

Check 3540 opposite last page.

Ultra-centrifuges — 12-page brochure gives notes on applications, field services available, features, and operating characteristics. SBL-2 — Beckman/Spinco Division, Stanford Industrial Park, Palo Alto, Calif.

Check 3942 opposite last page.

Consistency control of fibrous and pulpy slurries is described in four-page Tech Bul 16P1359—Fischer & Porter Co., 832 Jacksonville Rd., Hatboro, Pa.

Check 3943 opposite last page.

Cooling coil selection information, as well as detailed descriptive information on the coils themselves, is included in 52-page bulletin. Specifications, dimensional data, surface charts, circuiting diagrams, and 24 pages of capacity rating tables are provided in Bul 880 — American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Kentucky.

Check 3944 opposite last page.

Ball mill reported to give high grinding efficiency and have low ball and lining wear is subject of bulletin that provides specifications and other pertinent information. Bul AH-414 — Hardinge Company, Incorporated, 240 Arch St., York, Pa.

Check 3888 opposite last page.

Polystyrene technical reports are cataloged in publication that lists results of research conducted for Army, Navy, and Air Force and other government agencies, and German documents captured by the Allies during World War II. To obtain CTR-346 Polystyrene, remit 10c direct to Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C.

Fact file is a compact reference folder which contains technical bulletins describing types of contact cements, their properties, recommended bonding techniques, and handling. Instant-Lok Fact Files — Structural Products Div., National Starch Products Inc., 750 Third Ave., New York, N. Y.

Check 3945 opposite last page.

"It's not the salt mines, it's being sent up in a sputnik that worries me."

NEW LITERATURE

Manometers for measuring pressure and vacuum are illustrated and specified in 24-page catalog. Section assists in determining best combination of manometer type, range, scale, indicating liquid, mounting and accessories for specific applications. Cat 2008—King Engineering Corp., Box 680, Ann Arbor, Mich.

Check 3948 opposite last page.

Liquid ion exchanger tech notes are presented in 17-page booklet. Nature and properties of liquid amine anion exchange resin are discussed, followed by details in handling and operational steps in using this product. Amberlite LA-1 Tech Notes — Resinous Products Division, Rohm & Haas Company, Washington Square, Philadelphia 5, Pennsylvania.

Check 3949 opposite last page.

Instantaneous sensing and transmitting units including transmitters, valve positioner, and AC or DC recorders and controllers are detailed in company bulletin. Electronic instruments bul — Taylor Instruments Companies, Rochester, N. Y.

Check 3679 opposite last page.

Welding symbol changes are incorporated in standard containing many additions and improvements. Chart of symbols has been redesigned to include new developments. "Standard Welding Symbols" is $3. Wall-size Chart of Welding Symbols is $1.50; desk-size 50c. All may be obtained from Department T, American Welding Society, 33 West 39th St., New York 18, N. Y.

Fork-lift trucks, 3000 to 10,000 lbs capacities, are subject of four-page bulletin that illustrates and briefly describes features of truck construction. BW BU-481 — Engine Material Handling Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3950 opposite last page.

Asbestos filter sheets, and full line of filters and pumps are described and illustrated with photographs and schematic diagrams in 20-page catalog. Also described are bottle fillers and mixers. Cat 58 — Ertel Engineering Corporation, 20 Front St., Kingston, N. Y.

Check 3951 opposite last page.

Tubing selection and application is covered in 12-page booklet. Form and characteristics of 63 standard and 26 special materials cold-drawn into small tubing are included. Bul 41 — Superior Tube Company, 1512 Germantown Ave., Norristown, Pa.

Check 3952 opposite last page.

NEW LITERATURE

Nitroparaffins and their uses in coatings are described in 14-page technical bulletin amply illustrated with charts, graphs, and tables. TB-No. 11 — Commercial Solvents Corporation, 260 Madison Ave., New York 16, N. Y.

Check 3956 opposite last page.

Noncatalytic afterburners for automobiles as a means of reducing atmospheric pollutants are discussed in 38-page report illustrated with charts, tables, graphs and equations. Report No. 25 "Combustibility of Simulated Automobile Exhaust Gases" — remit $1.50 to Air Pollution Foundation, 2556 Mission St., San Marino, Calif.

Vibratory feeders, electromagnetic, are covered in 30-page illustrated catalog on equipment for hard-to-handle bulk materials. Data and specifications for line of 13 standard electromagnetic feeders, plus other types, are included. Vibrating feeders bul — Syntron Co., 110 Lexington Ave., Homer City, Pennsylvania.

Check 3957 opposite last page.

Filter presses, vertical leaf filters, filter media, and horizontal plate filters are detailed in company literature that also describes services. Filter literature — T. Shriver & Company, Inc., 846 Hamilton St., Harrison, N. J.

Check 4034 opposite last page.

Synchronous motors and controls are described in well illustrated 27-page booklet. Contained in brochure are motor selector charts, application data, and formulas for calculating power factor. Booklet B-7292 — Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa.

Check 3958 opposite last page.

Chemical processing equipment and services are described in six-page, two-color bulletin. A highlight is a section on what latest methods of chemical processing can mean to industry. Bul WC-120 — Graver Water Conditioning Co., Div. of Union Tank Car Company, 216 West 14th St., New York 11, N. Y.

Check 3959 opposite last page.

Ion exchange method of water conditioning is explained in 60-page pocket-size handbook. Softening, dealkalizing, and demineralizing processes are discussed from standpoint of equipment and chemicals required and quality of water produced. Bul Z-5 — Ion Exchange Div., National Aluminate Corporation, 6294 W. 66th Place, Chicago 38, Ill.

Check 3960 opposite last page.

Surface active agent, (3,5-dimethyl-1-hexyn-3-ol) is volatile, non-foaming (non-ionic) compound described in four-page bulletin. Included are applications, physical properties, comparative evaporation rates and synergistic wetting power. Bul S-4 — Air Reduction Chemical Company, Div. of Air Reduction Company, Incorporated, 150 East 42nd St., New York 17, N. Y.

Check 3961 opposite last page.

Electric industrial truck of 4000-lb capacity is shown in operation in four-page folder. Basic construction features, turning diagrams, and dimensional design data are provided. Model F-45T4 Bul — Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

Check 3962 opposite last page.

Analytical balance — of single pan design is described in four-page bul. Procedure of substitution weighing is described and advantages given. Bul 56 — William Ainsworth & Sons, Inc., 2151 Lawrence St., Denver 5, Colorado.

Check 3963 opposite last page.

Rotameters — for laboratory use are described in two-page bul. Rotometers are applicable to both liquids and gases. Connections can be of plastic, glass, or metal piping. Bul 18L — Schutte & Koerting Co., Cornwells Heights, Bucks Co., Pa.

Check 3964 opposite last page.

Pneumatic system for transferring ground products from attrition mills is detailed in bulletin that contains diagrammatic sketch showing relationship between equipment and attrition mill, as well as detailed table of specifications. Bul 158-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 3965 opposite last page.

Dimethyl ethers are discussed in 24-page catalog which explains physical and chemical properties and uses. Bibliography lists 44 references. "Chemical Products Bulletin" — Chemical Products Dept., Ansul Chemical Company, Marinette, Wis.

Check 3966 opposite last page.

"Electronic ear" to regulate feed rate to grinding mills is described in four-page bulletin which discusses how device is based upon grinding sound from mill. Bul AH-480 — Hardinge Company, Incorporated, 240 Arch St., York, Pennsylvania.

Check 3967 opposite last page.

Variable speed drives, ½ to 25 hp, chain-driven, are described and illustrated in company literature that shows construction and points out features. Book 2274 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 3591 opposite last page.

Process instruments — available for quick shipment — are covered in 52-page catalog. These include indicators, transmitters, recorders and controllers for flow, pressure, temperature, density, viscosity and consistency. Cat 2 — Fischer & Porter Co., 941 Jacksonville Rd., Hatboro, Pa.

Check 3968 opposite last page.

Selective analyzer — for process control is described in four-page bul. Instrument operates by analyzing gases according to thermal properties. Principle of operation is given. Bul No. 0716-2— Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pennsylvania.

Check 3969 opposite last page.

Rotary pumping hydraulic equipment data is contained in 28-page bulletin. Factors involved in pump selection are outlined, and commonly used hydraulic terms are defined. Bul 33 — Blackmer Pump Company, Grand Rapids, Mich.

Check 3970 opposite last page.

Dust control problems and how they are solved are described in unusual loose-leaf bulletin which uses variety of photographs to illustrate solutions. Containing 15 pages, bulletin also includes selection, pricing, and accessory information. Bul 82 — The Flexaust Company, Div. of Callahan Zinc-Lead Company, Inc., 100 Park Ave., New York 17, N.Y.

Check 3971 opposite last page.

Scale for bulk weighing of dry and free-flowing as well as sluggish materials is described in product data sheet. Operation of scale is thoroughly described, and specifications listed. Product Data Sheet 5807 — Richardson Scale Co., Clifton, N.J.

Check 3972 opposite last page.

Caustic soda is discussed in 26-page handbook, profusely illustrated, which includes basic information on various commercial forms of product and shipping containers. Major feature is set of tabulations and conversion charts which provide data on solutions. "Handbook on Caustic Soda" — Stauffer Chemical Company, 380 Madison Ave., New York 17, New York.

Check 3973 opposite last page.

NEW LITERATURE

Lift truck versatility is featured in four-page bulletin which shows how easily truck can be converted from fork lift to drum handler, platform carrier, utility scraper, or 10- or 15-cu-ft-capacity hopper carrier. "Moto-Bug" bul — Kwik-Mix Company, Div. of Koehring Company, Port Washington, Wis.

Check 3976 opposite last page.

Hammermills which feature crusher-feeder and permanent magnetic separator are described in two-page catalog sheet. Bul CH-M 581 — The Prater Pulverizer Company, 1515 South 55th Ct., Cicero 50, Ill.

Check 3977 opposite last page.

Control valves — are described in well illustrated 12-page booklet which gives details on construction and operating characteristics. Valve is combination of single-seated valve body and cylinder actuator. Optional accessories are illustrated. Bul LB-3 — Conoflow Corporation, 2100 Arch St., Philadelphia 3, Pa.

Check 3978 opposite last page.

Laboratory appliances are reviewed in 1040-page catalog. Many reference tables are included. For copy of Cat 59, write to Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

Storage rack system catalog features adjustable combination pallet, skid, and die rack. This rack can also be used as live-feeder type rack, drive-in rack, or as order-picking frame. Other racks and tiering frames are covered, too. Cat 58B — The Paltier Corp., 1701 Kentucky St., Michigan City, Indiana.

Check 3979 opposite last page.

Carbon and graphite properties and uses are described in 56-page manual so complete it even shows how products are made. Detailed application information for a number of mechanical, chemical, electrical, and refractory uses are described and illustrated. Cat 40B — Stackpole Carbon Company, St. Marys, Pa.

Check 3980 opposite last page.

Air pollution report of 212 pages is devoted to secondary atmospheric reactions of compounds such as those which occur in auto exhaust. Using as criteria the known rates of reaction, the report summarizes important reactions and eliminates from consideration those of little importance. To obtain "Photochemical Secondary Reactions in Urban Air", remit $6.00 direct to Air Pollution Foundation, 2556 Mission St., San Marino, Calif.

Indicating flowmeter, featuring vitreous enamel lined end fittings and designed for corrosive service, is described in four-page specification sheet. Spec Sheet 10A1710 —Fischer & Porter Company, 785 Jacksonville Rd., Hatboro, Pennsylvania.

Check 3982 opposite last page.

Fatty organic chemicals are described in 8-page booklet. Over 150 products, including some heretofore unavailable, are listed. "Aliphatic Organic Chemicals" — Armour & Co. Chemical Div., 1355 West 31st Street, Chicago 9, Illinois.

Check 3983 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Adjustable pump operating data are contained in eight-page bulletin which details handling liquids or hygro-scopic solids in suspension under variable capacity and head requirements. Bul 08B-9050 — Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.

Check 3984 opposite last page.

Electric tiering truck, rider-type, for narrow aisles is described in six-page circular. Operating and maintenance details on either 2000- or 3000-lb model containing 24-volt electrical system are presented. Circular 35K — Dept. R8-22, Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.

Check 3985 opposite last page.

Heat-transfer fluid designed specifically for snow-melting installations is detailed in company booklet. Information on typical installations and a short history of the development and use of snow-melting systems are included in 20-page manual. Dowtherm SR-1 booklet — Organic Chemicals Sales, The Dow Chemical Company, Midland, Mich.

Check 3986 opposite last page.

Power and gravity conveyors are illustrated and described in six-page bulletin which explains "assemble-yourself" construction, outlines details of engineering service, and includes sketch of typical two-floor conveyor system. Bul CL 858 — Conveyor Specialty Co. Inc., 33 Newport Ave., North Quincy 71, Mass.

Check 3987 opposite last page.

Glassed-steel reactors are described in eight-page bulletin that includes capacities, weights, and dimensions, as well as detailed information on standard and optional components. Schematic drawings for each design size show nozzle, piping, and drain locations. Bul 927 — The Pfaudler Co., Division of Pfaudler Permutit Inc., 1074 West Ave., Rochester, N. Y.

Check 3988 opposite last page.

Recording controllers — plus records and indicators are covered in 12-page bul on single-point and multi-point strip-chart recorders and recording controllers. Features, application data, and specifications are given. Bul GEA-6792 — General Electric Company, Schenectady 5, N.Y.

Check 3989 opposite last page.

Plastic laboratory ware, from beakers to vacuum drums, is illustrated and indexed in 16-page catalog. All popular plastics are represented, and tables outline their properties, indicating best for specified conditions. Cat P58 —Will Corp., Rochester 3, N.Y.

Check 3990 opposite last page.

Tubeaxial fans are described in seven-page catalog which charts recommended stack sizes, maximum horsepower, and maximum motor speed for variable stack velocity and air flow output. Cat 1110-B — Sturtevant Div., Westinghouse Electric Corporation, Hyde Park, Boston 36, Mass.

Check 3991 opposite last page.

Thiodiglycol useful in dye and lubricant industries is discussed in revised bulletin. Properties, test methods, and storage data are cited. "Kromfax Solvent"—Union Carbide Chemicals Co., Union Carbide Corp., 30 East 42nd St., New York 17, N.Y.

Check 3992 opposite last page.

Safety equipment users will find invaluable helps in 48-page catalog which serves as a guide to selecting, applying, and maintaining protective equipment for industrial applications. To obtain catalog, write to Chicago Eye Shield Company, 2719 W. Roscoe St., Chicago 18, Ill.

Check 3993 opposite last page.

Laboratory equipment is discussed in 1273-page catalog. Includes centrally located, integrated index and newly developed numbering system. Requests for Cat 400 should be made on company letterhead to Chemical Rubber Co., 2310 Superior Ave., Cleveland 14, Ohio.

NEW LITERATURE

Hygienic guides covering 62 subjects from acetaldehyde to zinc oxide are now available. Each guide covers a single chemical with latest available information on, among other things, maximum allowable concentrations, and engineering and medical control procedures with literature references. Guides are 25c each (one subject to sheet.) Free list of hygienic guides may be obtained from American Industrial Hygiene Association, 14125 Prevost, Detroit, Mich.

Check 3998 opposite last page.

Thermometers — and hydrometers for laboratory use are described in catalog which contains specifications and prices of over one thousand instruments. Of 18 pages, catalog also contains temperature conversion table. Cat 586 — Brooklyn Thermometer Co., 217-09 Merrick Blvd., Springfield Gardens, 13, New York, N. Y.

Check 3999 opposite last page.

Conveyor belt which is said to require no breaker fabric is detailed in 12-page brochure. Drawings are effectively used in describing compensation and other features of belt. Pages are arranged to represent an actual cross-section. Bul M302 — Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N. J.

Check 4000 opposite last page.

Packaging conveyors — Survey was made to determine degree of standardization that exists in packaging-conveyor heights, and to gather facts for presentation to machinery manufacturers for use in design of future equipment. "Advisory Service Report No. 349" may be obtained at $1.00 (members) or $1.50 (non-members) from The Packaging Institute, Inc., 342 Madison Ave., New York 17, N. Y.

Analyzers—Four-page catalog describes accelerator current integrator, photomultiplier photometer, milli-microsecond time-to-pulse-height converter, multi-channel pulse-height analyzer, non-overloading linear amplifier, and milli-microsecond time-measuring system. "Short Form Catalog"—Eldorado Electronics, 2821 Tenth St., Berkeley, Calif.

Check 4001 opposite last page.

British trade and technical publications, numbering more than 300, are described in recently published booklet. It is illustrated with pictures of front cover of each journal. "Business and Specialized Publications of Great Britain" — British Information Services, 45 Rockefeller Plaza, New York 20, N. Y.

Check 4002 opposite last page.

THAT'S INTERESTING

Button cells nickel size

Two new button cells for minimum power requirements have been produced by Gulton Industries, Inc. About the size of a 5c piece, units are said to be among smallest rechargeable sintered-plate nickel cadmium cells available. Hermetically sealed cells were designed specifically for miniature and subminiature electrical and electronic applications requiring minimum power.

Glutamine studies

A University of Texas biochemist will make a large scale study of how glutamine improves mentally retarded children. A gift of 25 lb of glutamine from General Mills Research Laboratories will permit continuation of a project halted three years ago.

For more information on product at right, specify 4005 see information request blank opposite last page.

NEW LITERATURE

Processing equipment such as pumps, pneumatic conveyors, fluidizing conveyors, rotary compressors, etc., are covered in 12-page illustrated bulletin. Applications and performance characteristics are discussed, operating principles are explained, and photographs show typical installation. Bul G-3B — Fuller Co., Subsidiary of General American Transportation Corporation, Catasauqua, Pa.

Check 4008 opposite last page.

Products catalog containing 38 pages describes properties and uses of 375 industrial, pharmaceutical, and agricultural chemicals. The 1958-59 issue is available from The Dow Chemical Company, Midland, Mich.

Check 4009 opposite last page.

Gage models, over 250 of them, including pressure, vacuum, compound, and pneumatic and electric transmitter, are specified in 40-page Cat NR-198 — Instruments Div., International Register Co., 2630 W. Washington Blvd., Chi-Bucks County, Pa.

Check 4010 opposite last page.

Compact axial-flow, positive-displacement blower-exhauster is described in bulletin that tells how unit can help increase production. Bul CB-157 — Dept. C-1, Air Appliance Div., U.S. Hoffman Machinery Corporation, 103 Fourth Ave., New York 3, N. Y.

Check 3698 opposite last page.

Chemistry of complex gold and precious metal ores is discussed in 54-page technical publication well illustrated with charts, tables, and graphs. "Chemistry of Cyanidation" — Explosives and Mining Chemicals Dept., American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.

Check 4011 opposite last page.

Density measurement — of liquids, slurries, or divided solids, without contacting measured material is described in 12-page bul. System is based on absorption of radiation by material using radioactive source. Bul NI-158 — Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, Ohio.

Check 4012 opposite last page.

Atomizing nozzles for spraying liquids in quantities up to about 3 gpm are subject of bulletin that includes information on sizes, dimensions, capacities, and materials of construction. Bul 6A-661 — Dept. JA-14, Schutte and Koerting Company, Cornwells Heights,

Check 4013 opposite last page.

Special-purpose alloys for tubing and pipe used especially in missile, rocket, nuclear energy, and chemical fields are described in 12-page bulletin. Bul T. D. 125 — Alloy Tube Division, Carpenter Steel Company, Union, N. J.

Check 4014 opposite last page.

Stencil inks applied with aerosol container, and other products, are described in four-page bulletin. Feature is color chart. Bul-58—Reynolds Ink, Incorporated, 4500 Euclid Ave., Cleveland 3, Ohio.

Check 4015 opposite last page.

Dynamometers — for use in measurement of tensile, compression, or torque forces, are described and typical applications illustrated in 88-page book. Different fields of application are indexed. Remit 50c on company letterhead. Dillon Dynamometers at Work — W. C. Dillon & Co., Inc., PO Box 3008, Van Nuys, Calif.

Lift truck of 2000-lb capacity is covered in eight-page illustrated bulletin that provides pictorial story about how this 35-hp truck operates. Bul BU 485 — Engine-Material Handling Div., Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

Check 4016 opposite last page.

Single red lead primer for rusted, weathered or new galvanized steel is described in technical letter consisting of three pages. Red Lead Technical Letter No 13—Lead Industries Association, 60 East 42nd St., New York 17, New York.

Check 4017 opposite last page.

"Why can't you come up with something revolutionary — like a hoola hoop."

NEW LITERATURE

Plating waste treatment systems are discussed in six-page reprint which covers both batch and continuous method for possible use in treatment of hexavalent chromium, cyanides, acids and alkalis. Appropriate flow diagrams and cutaways of treatment units are included. Tech Reprint T-163 — Graver Water Conditioning Co., Div. of Union Tank Car Co., 216 W. 14th St., New York 11, N. Y.

Check 4018 opposite last page.

Recording turbidimeter is described in three-page bulletin. Applications, principles of operation, and specifications are listed. Block diagram shows solids-removal operation. Bul GET-2741-9 — General Electric Co., Schenectady 5, New York.

Check 4019 opposite last page.

Industrial chemicals are subject of revised 12-page bulletin. Approximately 65 organic and inorganic compounds are included. Bul 100-B — Hooker Chemical Corporation, Niagara Falls, N. Y.

Check 4020 opposite last page.

Gas pumps, rotary positive, are covered in six-page revised bulletin. Technical rating data is clearly presented along with detailed design and construction data to aid in proper selection and application of equipment. Bul XA-458—Roots-Connersville Blower, a division of Dresser Industries, Inc., 900 W. Mount St., Connersville, Ind.

Check 4021 opposite last page.

Air-conditioning and ventilating-system standards now permit use of duct materials other than metal. Changes in standards are detailed in 24-page booklet. "Air Conditioning and Ventilating Systems of Other Than Residential Type (NFPA No. 90A) may be obtained by remitting 50c to National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

"Dry fluid" drive, available in drives and couplings in capacities from fractional to 1000 hp, is described in technical bulletin. Dodge Manufacturing Corporation, 6200 Union St., Mishawaka, Ind.

Check 3882 opposite last page.

Cyclone separator designs and controls are featured in four-page bulletin which stresses importance of proper apex discharges relating to classification efficiency. Cutaway drawings and apex capacity chart for cyclone users and others with classification problems are included in Bul 1400 — Equipment Engineers Inc., 41 Sutter St., San Francisco 4, Calif.

Check 4022 opposite last page.

NEW LITERATURE

Liquid level controls — suitable for water, gasoline, oil, alcohol, and acid in any container or storage vessel are described in 46-page catalog. Units shown include models for hazardous uses. Catalog Level-Master — Jo-Bell Products, Inc., 5456 W. 111th St., Oak Lawn, Ill.

Check 4026 opposite last page.

Manifold distribution systems for continuous distribution of industrial gases are described in 28-page brochure. Production, space and cost benefits of custom-built installations are discussed. Bul N-125 — National Cylinder Gas Div., Chemetron Corporation, 840 N. Michigan Ave., Chicago 11, Illinois.

Check 4027 opposite last page.

Fixed tube bundle heat exchangers (shell-and-tube) which are available in more than 180 standard models are illustrated and described in 16-page catalog. An interesting feature is an oil viscosity chart. Cat No. 1258 — Young Radiator Company, 724 Marquette St., Racine, Wis.

Check 4028 opposite last page.

High-strength materials containing at least 85% aluminum oxide in the corundum form are described and illustrated in four-page bulletin. Outstanding physical and electrical properties of these ceramic materials, available either dense (i.e. vacuum tight, vitrified) or porous, are listed. Bulletin 858 — Coors Porcelain Company, 600 Ninth St., Golden, Colo.

Check 4029 opposite last page.

Gas chromatography — Ten-page data sheet explains how to raise quantitative accuracy by peak area and peak height measurements. Details steps in several typical analyses. Data Sheet GC-86-M1 — Beckman/Scientific & Process Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.

Check 4030 opposite last page.

Rotary air locks for dust collection, pneumatic conveying, and feeding applications are subject of four-page technical bulletin which discusses design features, selection factors, and dimensions and capacities. Bul V-3558 — The Ducon Co., Inc., 147 E. Second St., Mineola, N. Y.

Check 4031 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

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Check 4036 opposite last page

that's interesting

Thought-provoking slants on projects and products

Warning device triple sensitive

After five years of research, Minneapolis-Honeywell Regulator Company has developed a fire-explosion warning device that signals fire, smoke, and vapors. It is claimed to be the first device sensitive to all three indications of trouble. The cathode tube, about the size of an index finger, operates by adding up impulses of electricity generated as it detects and counts ultraviolet rays emitted by its environment. (*Industrial Research Newsletter,* Armour Research Foundation of Illinois Institute of Technology)

What are kids doing in the office?

Lloyd's of London ran a survey to determine what actually happens to paper clips purchased by British firms. The result: dropped on floor, left in drawers, and swallowed by children, 24.6%; stakes for card games, 19.4%; twisted and broken during telephone conversations, 14.2%; makeshift hooks on women's garters and brassieres, 7.2%; toothpicks and ear scratchers, 5.4%; nail cleaners, 5.3%; pipe cleaners, 3.9%; paper clips, 20%. (*Kaiser Builder,* Henry J. Kaiser Company)

LA smog research making headway

The Air Pollution Foundation says that two more years of research work should produce enough essential facts to enable private industry to build workable, economic, auto-exhaust controls helping greatly to eliminate the smog problem. According to Foundation research so far, formation of ozone (basic LA smog ingredient) from auto exhaust is not affected by amount of olefins in gasoline. (*Industrial Research Newsletter,* Armour Research Foundation of Illinois Institute of Technology)

If you want more information on processes, materials, controls, or other developments discussed herein, as you read this issue, ask our READER SERVICE DEPARTMENT . . . use this sheet

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3539	3583*	3627*	3671	3715	3759
3540	3584	3628	3672	3716	3760
3541	3585	3629	3673	3717	3761
3542	3586	3630	3674	3718	3762
3543	3587	3631*	3675	3719	3763
3544	3588	3632	3676	3720	3764*
3545	3589	3633	3677	3721*	3765*
3546	3590	3634	3678	3722	3766
3547	3591	3635	3679	3723	3767
3548	3592	3636	3680	3724	3768
3549	3593	3637	3681	3725	3769
3550	3594*	3638	3682	3726*	3770
3551	3595	3639	3683	3727*	3771
3552*	3596*	3640	3684	3728	3772
3553	3597	3641*	3685	3729	3773
3554	3598	3642	3686	3730	3774
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3556	3600*	3644	3688	3732	3776
3557	3601*	3645	3689	3733	3777
3558	3602	3646	3690	3734	3778
3559	3603*	3647	3691	3735	3779
3560	3604	3648	3692	3736	3780
3561	3605	3649	3693	3737	3781*
3562	3606	3650*	3694	3738	3782
3563	3607	3651	3695	3739	3783
3564	3608	3652*	3696	3740	3784
3565	3609	3653	3697	3741	3785
3566	3610	3654	3698*	3742*	3786
3567	3611	3655	3699	3743	3787
3568*	3612	3656	3700	3744	3788
3569	3613	3657	3701	3745	3789
3570	3614	3658	3702	3746	3790
3571	3615	3659	3703	3747	3791
3572	3616*	3660	3704	3748	3792
3573	3617	3661	3705	3749	3793
3574	3618	3662	3706	3750	3794
3575	3619	3663	3707	3751	3795
3576	3620	3664	3708	3752	3796
3577	3621	3665	3709	3753	3797
3578	3622*	3666	3710	3754	3798
3579*	3623	3667	3711	3755	3799
3580*	3624*	3668	3712	3756	3800
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Phillip Wylie take note

Dr. Harry F. Harlow of Wisconsin University's primate laboratory has created a "mother machine" which not only provides monkeys with "breast fed" milk but is constructed of foam rubber for softness, terry cloth wrapped for cuddliness, provided with an internal electric lamp for warmth, and with a spherical wooden head equipped with a seemingly watchful eye. Harlow and his colleagues report that the baby monkey has affectionately accepted the mother-machine. By using this device, the scientists hope to study and understand better the complexities of human love as well as the effect of parental emotions upon the psychological make-up of the offspring. (*Poro-Scope,* Pall Corporation)

Mark Twain hear this

A majority of weathermen belonging to the American Meteorological Society think that weather control or modification may be possible within 10 to 15 years. The control would probably be in the form of increased or decreased precipitation and prevention of hail and lightning. (*Industrial Research Newsletter,* Armour Research Foundation of Illinois Institute of Technology)

Check 4041 opposite last page

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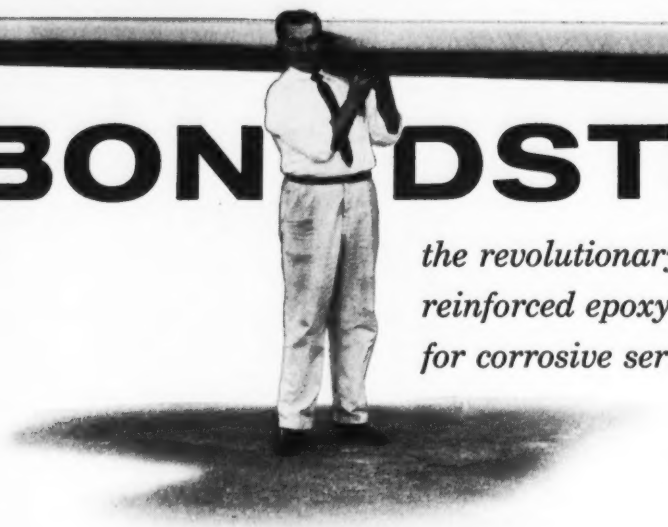

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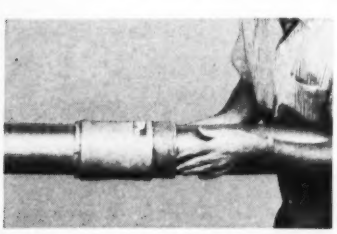

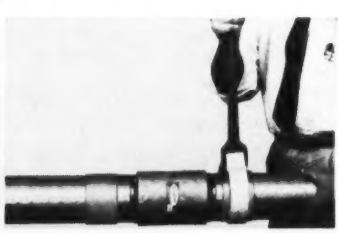

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